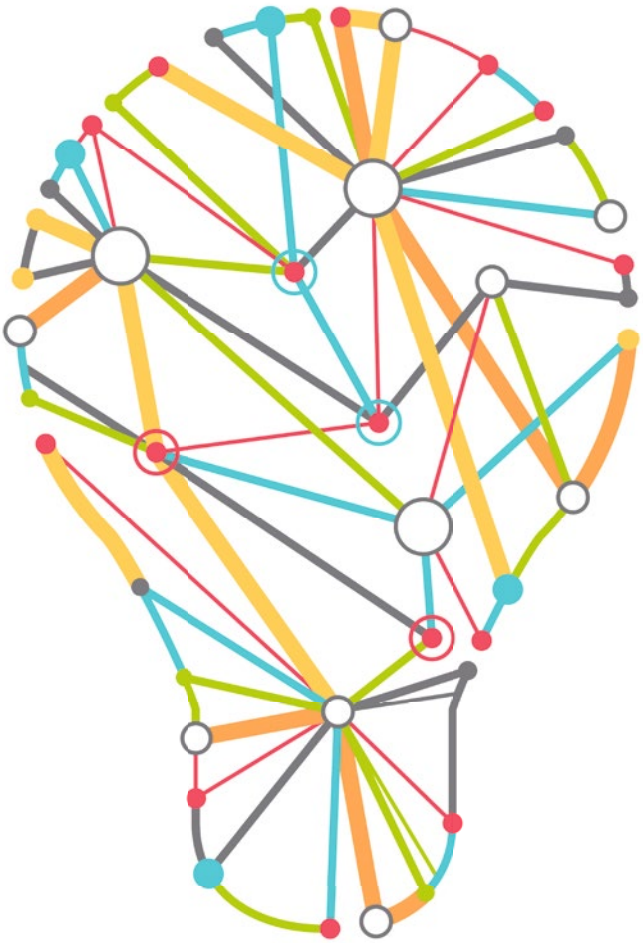

The Palgrave Handbook of Social Creativity Research

Edited by
Izabela Lebuda · Vlad Petre Glăveanu

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Palgrave Studies in Creativity and Culture

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Both creativity and culture are areas that have experienced a rapid growth in interest in recent years. Moreover, there is a growing interest today in understanding creativity as a socio-cultural phenomenon and culture as a transformative, dynamic process. Creativity has traditionally been considered an exceptional quality that only a few people (truly) possess, a cognitive or personality trait 'residing' inside the mind of the creative individual. Conversely, culture has often been seen as 'outside' the person and described as a set of 'things' such as norms, beliefs, values, objects, and so on. The current literature shows a trend towards a different understanding, which recognises the psycho-socio-cultural nature of creative expression and the creative quality of appropriating and participating in culture. Our new, interdisciplinary series Palgrave Studies in Creativity and Culture intends to advance our knowledge of both creativity and cultural studies from the forefront of theory and research within the emerging cultural psychology of creativity, and the intersection between psychology, anthropology, sociology, education, business, and cultural studies. Palgrave Studies in Creativity and Culture is accepting proposals for monographs, Palgrave Pivots and edited collections that bring together creativity and culture. The series has a broader focus than simply the cultural approach to creativity, and is unified by a basic set of premises about creativity and cultural phenomena.

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For my grandmothers—Ala and Stasia, Iza
For Constance, Corina and Petre, Vlad

Contents

Notes on Contributors

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http://mic.fgm.it
https://www.youtube.com/watch?v=bEusrD8g-dM

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Re/searching the Social in Creativity, Past, Present and Future: An Introduction to the Palgrave Handbook of Social Creativity Research

Izabela Lebuda and Vlad Petre Glăveanu

The Palgrave Handbook of Social Creativity Research is devoted to the social nature and context of creativity, an area of research that has received little interest traditionally and yet, today, is growing at a fast pace. Following the pioneering book Social Creativity (1999), published in two edited volumes by Montuori and Purser, the present handbook takes stock of past and present work as well as envision future developments within this field, almost two decades later. More specifically, it also focuses on methodology as a critical component in advancing the social study of creativity.

Since the 1970s there has been increasing interest in perceiving creativity in a more holistic, social manner (see Amabile, 1983; Csikszentmihalyi, 1988; John-Steiner, 1989; Simonton, 1975). Although most researchers nowadays would agree that considering the context in which creativity is expressed and received is crucial for understanding creativity itself (e.g., Simonton, 1975, 1976, 1990; Stein, 1953), research in the so-called He and I-paradigms (Glăveanu, 2010), which concern themselves with eminent individual performance and the psychology of individual differences, is still dominant. Despite the fact that decades have passed since the topic of social approaches to

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creativity was first raised, calls to broaden our knowledge in this area continue to be made (see Glăveanu, 2014; Hennessey, 2003, 2017).

Why is creativity social? A series of arguments have been offered across the decades and many of them are presented, elaborated on and advanced within in this book. A selective review of such arguments includes the following:

1. The 'birth' of creative expression in early human development would be impossible in the absence of social interaction. It is because the child is gradually introduced by care-givers to the world of symbols and cultural objects that he or she becomes capable of engaging in pretend play – the developmental origin of both creativity and imagination (Gardner, 1982; Winnicott, 1971);
2. Creativity is enacted first and foremost in dyads, groups, and communities. Direct or mediated forms of collaboration are pervasive when it comes to creative activity. Group or team creativity is the norm rather than the exception in a variety of contexts, from schools to the workplace (Barron, 1999);
3. Beside explicit forms of collaboration, we always create with other people 'in mind'. We consider the knowledge, views and perspectives of others when generating ideas, objects, or performances. We also internalise their views in the way we evaluate the creativity of what we produced (Bakhtin, 1981);
4. Creativity is based on division of labour within society. Even the most individualistic moments of creativity depend on access to tools and technologies (from simple paper and pencil to performant smart phones and laptops) and these are produced by others in a society that accumulates cultural resources (Becker, 2008);
5. Creativity requires social validation. Indeed, judgements about what is more or less creative are social in nature and depend on dialogues and negotiations of meaning and value between various people and groups (e.g., gatekeepers, colleagues, critiques, the general public). This doesn't mean that we need others to always view and judge our products, we ourselves are the first audiences of our own creativity and we appreciate (or not) our productions based on social norms and conventions (Csikszentmihalyi, 1988);
6. The evaluation and practice of creativity vary across cultures and historical times. More 'individualistic' societies consider creativity as an individual attribute and focus on the novelty of the creative product and its potential to challenge tradition. More 'collectivistic' cultures, on the contrary, consider creativity as a relational attribute, appreciate most its value and meaning, and focus on how it renews tradition rather than break away from it (Lubart, 1999);

7. Creativity is ever-present in human social interactions and substantiates the formation, maintenance and development of society (Simmel, 1949). In addition, individual and collective forms of creative agency underpin social change and transformation through a variety of means, from creative protests to artivism;
8. The creativity of artefacts produced some time ago (i.e., that are not new anymore, one of the definitional conditions of creativity) depends on how these artefacts are appropriated and reinterpreted by future generations. Social transmission, fundamental for cultural participation, is not defined by exact reproduction but by the continuous social transformation of what is being transmitted (Eco, 1989);
9. Creativity cannot exist outside of constraints (Stokes, 2005) and some of the most important constraints imposed on it are social in nature, from the pressure to respect certain norms and conventions to the way in which time or budgets are allocated to the creator;
10. The creative process depends on being able to develop new perspectives on reality. These new perspectives have a deeply social and embodied origin as they come from us experiencing various positions in the physical and material world and being capable to re-position ourselves and move between positions and perspectives in a highly dialogical manner (Glăveanu, 2015);
11. Social interactions are fundamental for life-creativity or the creativity and imagination invested in building a life course. Making life choices, anticipating the future, and creating (and recreating) an identity are, at once, social and creative acts (Zittoun & de Saint Laurent, 2015);
12. Creativity is also a material process, but this materiality cannot be understood outside of a social context. Paraphrasing Vygotsky (1978), who said that the road between the child and the object passes through another person, we can say that the connection between creators and their material tools and productions depends on the interactions with others;
13. Implicit theories of creativity or personal, lay understandings of what creativity is, are consequential for what we consider creative and whether or not we engage in creative activities ourselves. However, these are not mental schemas constructed, in isolation, by individual minds but social representations, acquired and negotiated within a social context (Glăveanu, 2011);
14. Various aspects of the social environment, from family to work colleagues, have a direct impact on how, when, with whom and why we create

(Lebuda & Csikszentmihalyi, 2018). These contexts guide creative expression in a more subtitle or direct manner (Bourdieu, 1993);

15. The social environment also offers the resources and contents we use to create. The ideas and objects we create combine what already exists and what exists does so because of the system of social relations that generate, maintain and transmit it (Festinger, 1983);
16. Creative action is grounded in learning and apprenticeships and these are fundamentally social processes. Either in the form of direct instruction or guided participation, social interactions create a zone of proximal development for individual creativity (Rogoff, 2003);
17. Cooperation and competition are both essential for creativity even if their impact (positive or negative) depends on age, domain, stage of the creative process, etc. Fruitful creative collaborations require tension and conflict to advance creative expression, of course as long as the interaction is based on mutual respect (John-Steiner, 1992);
18. Nowadays there is an increasing recognition of the active role of audiences in the creative process. Notions such as co-creation, user innovation, and the 'produser' (see Potts et al., 2008) are increasingly used to point to the distributed nature of creative action;
19. Creative identities, mindsets and self-efficacy, each one of them key for creative production (see Karwowski & Kaufman, 2017), are all forgotten through social interaction, social comparison and the use of social categories to reflect on the self;
20. Persuasion has been recognised as a fifth P of creativity alongside person, process, product and press (Simonton, 1995). This reflects the importance, in creativity, of not only being skilled at producing an outcome but also advocating for it, convincing others of its novelty and usefulness, skills that are in fact two facets of the same coin;
21. Last but not least, creativity can be best understood as a form of communication (Sobrinho & Glăveanu, 2017), a process through which our emotions, thoughts and intentions are materialised and expressed in order to be seen, appreciated, discussed and/or used by others. In the end, creativity is the process through which we both build on and continuously construct ways of connecting with others and understanding them, including as a means of understanding ourselves.

The items above, taken together, argue that creativity on the one side and culture and society on the other are interdependent phenomena. But this interdependence offers creativity a level of complexity that makes it intrinsically challenging to unpack methodologically. It has been suggested that the

limited interest in and number of publications dedicated to the social nature and context of creativity results from the multiple challenges standing in the way of doing empirical research in this area (Tang, 2015). To address this limitation, we dedicated this volume to the methodological and empirical issues related to 're/searching the social' in creativity studies as both an important and timely theme. All the contributors to this edited book intend therefore to introduce readers to specific methods and techniques used in research into creativity that that can help study this phenomenon in its relation to culture, contextual influences, communication, interaction and collaborative work.

The handbook is organized into three main parts. The first one focuses on methodology. In each chapter here, authors present research methods, techniques and tools. Among others, there are chapters related to traditional methods in the psychology of creativity like the historiometric method, the consensual assessment technique, but also more recent ones like social network analysis, life positioning analysis, or the serial reproduction method.

This part is propaedeutic to a large degree, and explains how to conduct research and/or analyze the results obtained as well as how to reflect on the advantages and disadvantages of each methodological choice. We hope that this section of the volume will be especially useful for early career researchers, students working on empirical projects, as well as experienced researchers looking for new and innovative methodologies.

The second part, reporting empirical researches, presents interesting and up-to-date findings concerning the social nature and context of creativity. Among others, there are chapters that use qualitative methods like dialogical analysis or the case study method, while others employ psychometric methods to study, for example, implicit theories of creativity among different cultures, the relation between structuring team idea evaluation and the selection of creative solutions, or review problems in measurement, for example in measuring identity and creativity in a virtual setting.

This section not only informs readers about current work, but is also indicative of the wide range of interests among young or established researchers alike, as illustrated by their original choice of topics and methods.

The final part of the book – reflections on the state of social research into creativity – includes contributions from researchers coming from different domains, who comment on areas which require further methodological scrutiny, empirical verification, and topics that should inspire additional theoretical work. Among others, there are chapters with reflections on how to study creative thought and action in schools, how neuroscience relates to social

cognition, or what the role of creativity might be in the cyber-physical society or in advancing a social justice agenda.

The chapters in this handbook consider a wide range of issues related to creativity, from creative potential to professional and eminent creativity, and showcase various research approaches (qualitative, quantitative, and mixed). As such, we hope this volume will be of interest for proponents of both 'elite' and 'egalitarian' or 'democratic' approaches to creativity, for positivists and constructionists alike. In fact, the collection of chapters is likely to inspire more triangulation of methods, methodological innovation and interdisciplinary research, all aimed at furthering our understanding the social nature of creativity and the way it can be enhanced in practice.

Our main hope is that the ideas presented here will stimulate discussion and guide researchers towards developing a culture-inclusive and socially engaged creativity research agenda (Glăveanu, 2017; Montuori, this volume; Stetsenko, this volume). More and more often it is said that creativity could be a "stepping stone toward a brighter future" (Kaufman, 2018). We share the belief that creativity could and should be one of our main tools to solve world problems, that it is essential in dealing with fundamental inequality and injustice. Our proposition is that a deeper research exploration of social creativity could help improve our understanding of creativity as a whole, and enhance our possibility to resist totalitarian tendencies, intolerance, and nationalism (e.g., Sassenberg & Moskowitz, 2005).

This content of this handbook is one of best proofs that creativity is indeed a social phenomenon. We were inspired to prepare it by our students, who want to understand better how to conduct creativity research, and by ongoing discussions with our colleagues, who study different social facets of creativity. Following a highly social process ourselves, as editors, we exchanged ideas and, after finding a common resolution, invited many scholars who, we believe, share our enthusiasm for social creativity research. Each one sent us a proposal for their chapter, and these proposals reshaped the initial ideas about the book. When we presented the proposal to publishers, they had further insights into how to develop this project. In the end, many people and conversations impacted how the handbook looks today and we can only hope that its content will bring about many new conversations.

Because so many people offered valuable insights have been substantial for the handbook, we are unable to thank them all. We would like to express our sincere gratitude, first of all, towards all authors who kindly agreed to take part and contribute chapters. We would like to thank them for they time, effort and for their enthusiasm for this project, without which the present book would not have been possible. We also want to express our gratitude for

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In the end, we create *with*, *for* and *towards* others, a statement that doesn't simply reflect an epistemological choice but points us to an ontological fact. Creativity might be constructed through dialogues and interactions, but this doesn't mean that it has no substance or 'reality' of its own. Its reality is precisely that of dialogues and interaction and research done in this area that doesn't take this social ontology into account is at best partial, at worst misleading. We hope, through this handbook, to offer the community of creativity scholars, researchers and practitioner the theoretical and methodological means needed to understand, explore, and foster 'social creativity' – as explained above, a rather tautological formulation.

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Part I

Methodological Approaches to the Social in Creativity Studies

2

The Sociocultural Context of Exceptional Creativity: Historiometric Methods

Dean Keith Simonton

I first became interested in creativity research over a half century ago as a college undergraduate. At that time, inquiries into this topic featured a clear focus on the individual creator. After all, the researchers themselves were primarily cognitive, personality, developmental, and educational psychologists whose research operated at the personal level. Participants were singular persons. Yet when I applied to graduate school, I did not seek admission to a program in any of these psychological specialties. Instead, I sought to enter a specialty that back then had no involvement whatsoever in creativity research, namely social psychology. Even more oddly, the social psychology program was not even located in a psychology department but rather was housed in Harvard's Department of Social Relations, a now-defunct unit that included cultural anthropologists and sociologists! The result four years later was a doctoral dissertation with the main title "The Social Psychology of Creativity" (Simonton, 1974). According to a search on Google Scholar, this title represents the very first time this subfield of creativity research was explicitly identified. In fact, the thesis title some years later inspired Teresa Amabile (1982, 1983) to adopt the same term to describe her own distinctive research program. By the end of that millennium, the social psychological perspective became fully recognized in the field (Simonton, 2000a). Creativity was no longer a purely individual phenomenon. But what motivated me adopt such an unconventional course in the first place?

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The answer was straightforward: I was not fascinated with everyday creativity but rather with creative genius. This fascination was part of a broader interest in achieved eminence in any domain, especially in such leadership domains as politics and war. For a pure creativity researcher, this wide scope may seem somewhat strange. Yet long before creativity became a recognized topic of scientific research, investigators studied the various forms of genius. The first notable example is Francis Galton's 1869 *Hereditary Genius*, which studied achieved eminence in both creative domains, such as science, art, literature, and music, and leadership domains, such as politics, war, and religion—plus added high achievement in sports, namely, rowing and wrestling! Much later Catharine Cox (1926) published her *The Early Mental Traits of Three Hundred Geniuses* that encompassed all major guises of both creativity and leadership (albeit no sports, in her case). Even today researchers will sometimes adopt an inclusive approach in order to make comparisons among the diverse ways of attaining exceptional distinction (e.g., Damian & Simonton, 2015; Simonton & Song, 2009). The social psychology of creative genius may or may not equate to the social psychology of political, military, or religious genius.

At the same time, the social psychology of creative genius may not necessarily overlap the social psychology of creativity in general. For example, although genius-level creators and everyday creators may share certain contextual influences, such as interpersonal relationships, nothing mandates that they operate in the same way. Yet another contrast is even more fundamental. Social psychology typically concentrates on how the social environment influences the individual. Thus, Amabile's (1983) research program began by examining how social expectations affected intrinsic versus extrinsic motivation, and by that effect impacted creative performance on laboratory tasks. Much less common are inquiries into how the single individual shapes the social environment. Yet the reverse causal arrow is crucial in understanding creative genius. Indeed, genius must be defined by the magnitude of that individual-to-society arrow. As Galton (1869) himself put it, genius must be defined by "the opinion of contemporaries, revised by posterity" that establishes the widespread reputation "of a leader of opinion, of an originator, of a man to whom the world deliberately acknowledges itself largely indebted" (p. 37). Hence arises "Big-C" creativity, in stark contrast to "little-c" creativity: Only the former requires a pervasive social consensus that endures the "test of time" (Simonton, 2013). In brief, creative genius is the most "social" of all types of creativity. The "social" in Amabile's consensual assessment technique pales in comparison.

Yet as soon as I made the decision to study creative genius, a severe problem immediately presented itself: How can such creators be studied scientifically? The standard methods for studying creative genius proved totally inadequate for the questions that I wanted to address, as will be demonstrated shortly. After that demonstration, I will turn to an alternative methodology that is ideally suited to investigating this core phenomenon.

Standard Methods

The dominant techniques for studying creativity are psychometric assessments and laboratory experiments. The former is a correlational method involving the application of established instruments to research participants. The instruments may include divergent thinking tests, self-report questionnaires, personality inventories, and other individual-differences measures, while the participants usually range from school children to college students, albeit adults are occasionally studied as well (e.g., Feist, 2014). Unlike psychometric assessments, laboratory experiments are not correlational but rather use random assignment and active manipulation of the independent variables to enhance causal inference (e.g., Amabile, 1996). For practical reasons, the research participants are also more likely to be college undergraduates taking introductory psychology courses. It is much easier to administer psychometric instruments—which now can be done on line—than to recruit off-campus populations for controlled experiments. Of course, these two strategies can be combined; participants in a laboratory experiment can be subjected to psychometric assessments (often executed in the "pre-screening"). Yet this methodological combination does not enhance the researcher's capacity to study creative geniuses.

Both standard methods work perfectly well for most purposes. However, for three main reasons they tend to prove deficient for studying creative genius.

First, it is really difficult to recruit genuine creative geniuses to participate in such investigations, particularly in laboratory experiments. To be sure, the task is not impossible. In the heyday of early creativity research the Institute for Personality Assessment and Research (IPAR) managed to invite notable mathematicians, creative writers, and architects to the Berkeley campus of the University of California for intensive psychometric measurements (e.g., Barron, 1963; Helson, 1971; MacKinnon, 1978). Likewise, Anne Roe (1953) was able to convince 64 eminent physical, biological, and social scientists to participate in various assessments. Yet such inquiries are extremely rare,

particularly today, when publication pressures tend to discourage labor-intensive inquiries. In fact, contemporary research of this nature is more likely to rely on the more accessible university professors who do not attain the same heights of achieved eminence (e.g., Feist, 1993; Grosul & Feist, 2014). Among the scientists sampled, for example, the researcher might get a few members of the National Academy of Sciences and perhaps a Nobel Laureate, if lucky (but see Zuckerman, 1977).

Second, to fully comprehend the phenomenon of creative genius we should really require that the studied creators be deceased until their reputations have stabilized—or "revised by posterity" to use Galton's phrase. Not only can contemporary eminence dissipate with time, but "neglected geniuses" can emerge upon posthumous evaluation (Weisberg, 2015). In the first case, Nils Gustaf Dalén received the 1912 Nobel Prize in Physics for inventing "automatic valves designed to be used in combination with gas accumulators in lighthouses and buoys" (https://www.nobelprize.org/nobel_prizes/physics/laureates/1912/index.html) when Albert Einstein had already been unsuccessfully nominated for his far more enduring work in theoretical physics—achievements that would not receive the long overdue honor until nearly a decade later! In the second case we have such obvious overlooked creators as Gregor Mendel, Emily Dickinson, and Vincent Van Gogh—all more eminent today than in their own times. Augmenting this problem all the more is the fact that the greatest creative geniuses produce prolific work throughout their careers, even creating masterworks toward the very ends of their lives. Although these creations would necessarily enhance their long-term reputations, most often a late work indicative of an "old-age style" or "swan song" cannot be identified until after the creator dies (Lindauer, 1993; Meredith & Kozbelt, 2014; Simonton, 1989b). Only after the latter event does the researcher have access to the individual's complete creative career. This access is absolutely critical for research on career trajectories (Simonton, 1991a, 1991b, 1997a).

Third, and perhaps most tellingly, neither psychometric measurements nor laboratory experiments can scrutinize the vast range of contextual factors that can impinge on either creative development or creative productivity across the life span. Historic creators grow up and are active in many different times and places that represent a diversity of social, cultural, political, and economic conditions (Kroeber, 1944; Murray, 2003; Simonton & Ting, 2010). Yet standard methods necessarily confine the sample of participants to a circumscribed group of creators who are markedly homogeneous in these very conditions. To illustrate, consider Roe's (1953) 64 eminent male scientists. All were born in the United States in the late 19th or early 20th century, and thus define a cohort with birth years all separated by no more than 29 years. Accordingly, all

experienced the Great Depression and World War II. Even worse, about 90% of the sample could be classified as WASP ("white Anglo-Saxon Protestant"). The same sociocultural homogeneity is witnessed in laboratory experiments that rely heavily on WEIRD participant pools taken from "Western, educated, industrialized, rich and democratic" societies (Henrich, Heine, & Norenzayan, 2010, p. 29). These participants are even weirder in that they hail almost exclusively from the last half century or so. For example, not a single participant in any psychometric or experimental study was active during the Golden Age of Athens, the Italian Renaissance, or the Scientific Revolution!

In a nutshell, if a social psychology of creativity seeks to understand geniuses like Isaac Newton, René Descartes, Miguel de Cervantes, Leonardo da Vinci, and Ludwig van Beethoven, standard research methods simply will not do. Hence arises the alternative.

Historiometric Methods

It may come as a surprise to most creativity researchers, but historiometric methods are far older than both standard methods, whether psychometric or experimental. The first inquiry into creativity was a quantitative analysis of the relation between creative productivity using a sample of highly eminent English and French dramatists (Quételet, 1835/1968). That was more than 180 years ago! Admittedly, because this little study was tucked away in a much larger work largely devoted to establishing the normal distribution as descriptive of individual differences, the contribution is often overlooked. Therefore, the first high-impact historiometric study of creative genius was clearly Galton's 1869 monograph mentioned earlier (but based on Galton, 1865; Simonton, 2003). Later one of Galton's disciples, James McKeen Cattell (1903) first devised methods for quantifying the differential eminence of 1000 historic creators and leaders. It was this assessment that Cox (1926) used both to obtain her sample of 301 geniuses and to calculate the correlation between estimated IQ and achieved eminence (Simonton, 2009b). Cox explicitly referred to her methodology as "historiometry," patterned after the "psychometry" that was then used for psychometrics. At the beginning, in fact, historiometry and psychometry were largely practiced by the same researchers. Besides Galton, Cattell, and Cox, the dual practitioners included Lewis Terman (1917) and Edward Thorndike (1936, 1950), two pioneers in the development of intelligence tests. Indeed, Cox's historiometric study of geniuses constitutes the second volume of Terman's (1925–1959) classic psychometric study of high-IQ children.

Yet, in truth, the term "historiometry" was first introduced by the geneticist Frederick Woods (1909, 1911). Although he believed that the method was ideally suited to the "psychology of genius," his own applications were restricted to leadership rather than creativity (Woods, 1906, 1913; see also Simonton, 1983, 1984b; Thorndike, 1936). In these applications Woods anticipated the later emergence of historiometrics as a valuable method in leadership research (Ligon, Harris, & Hunter, 2012). For instance, the method has made major contributions to our understanding of the performance of presidents of the United States (Simonton, 2012). At first glance, this particular research specialty may seem remote from the social psychology of exceptional creativity. But it can be readily argued that creative genius counts as a particular form of leadership: Such geniuses are *leaders* in their respective domains of creativity to the extent that they exert personal influence over other members of their chosen field. It is thus no accident that my very first book was titled *Genius, Creativity, and Leadership: Historiometric Inquiries* (Simonton, 1984a). Nor is this linkage confined to the matter of extraordinary impact, or achieved eminence. Creativity and leadership also share a large number of theoretical issues and causal factors (Simonton, 2009a). For example, a big substantive question for both phenomena is whether achieved eminence is a matter of being the "right person" or just happening to be "at the right place at the right time," or what is sometimes called the "genius versus zeitgeist" debate. In more socio-psychological terms, this question involves the relative influence of individual and situational variables, where the latter very often concern the social context.

Needless to say, the methodology has become much more sophisticated in the century that has elapsed since it first received a technical label. Indeed, a whole monograph has been devoted to historiometric techniques (Simonton, 1990; see also Simonton, 2014a). Here I can do no more than provide a brief overview of its main features. These features entail: case sampling, unit definition, variable measurement, and statistical analysis.

1. *Case sampling*—All creativity researchers conducting empirical research begin with a sample of cases. Ideally, these cases are randomly sampled from a larger, well-defined population. In practice, most investigators rely almost exclusively on "convenience samples" consisting of whoever happens to sign up for a given posted study, whether psychometric or experimental. It goes without saying that such samples would be extremely fortunate to obtain even a single creative genius. By comparison, historiometric studies typically *begin* sampling with the most eminent creators in a domain (or set of domains) and then work down to some

minimum threshold of eligibility, thereby assuring that no top-notch creative genius is omitted from the sample. Eminence often is assessed by prominence in various standard reference works, such as encyclopedias, biographical dictionaries, and histories (e.g., Murray, 2003; Simonton, 2017). Alternatively, the sampling criterion might be founded on expert ratings, journal citations, performance frequencies, or receipt of major awards, such as Nobel Prizes (e.g., Jones, Reedy, & Weinberg, 2014; Simonton, 1992). The net outcome is a target sample of creators who *exemplify* the creativity in a domain. Better yet, because the resulting sample will be geographically and historically diverse, it will represent a diversity of social circumstances under which creative achievement can emerge.

2. *Unit definition*—Standard methods most commonly use the individual as the unit of analysis, and historiometric methods will often do so as well (e.g., Raskin, 1936; Simonton, 1977). Yet that is not the only option. Instead, the analytical unit may become either smaller or bigger. On the small side, researchers can use single creative products, such as musical compositions, poems, paintings, or scientific journal articles (e.g., Kozbelt, 2011; Simonton, 1989a). On the big side, investigators can aggregate individual creators into larger units, including both cross-sectional units such as nations or civilizations and transhistorical units such as years, decades, or generations (e.g., Candolle, 1873; Simonton, 1988; Sorokin, 1937–1941). These aggregations permit the creativity researcher to assess the impact of contextual variables, such as war, economic prosperity, cultural heterogeneity, and ideological diversity (e.g., Naroll et al., 1971; Simonton, 1997b). Finally, the smaller units can be combined with the larger units to yield multi-level designs, like creative products nested within individual creators who are then nested within historical periods or geographical locations (cf. Simonton, 1996, 2000c).
3. *Variable measurement*—Because the units of analysis can vary so greatly, so may the quantitative assessments: (a) creative products might be evaluated on impact, content, and style (e.g., Cerridwen & Simonton, 2009; Cerulo, 1988; Kozbelt, & Burger-Pianko, 2007); (b) creators may be assessed on productivity, influence, intelligence, personality, and values or beliefs (e.g., Cassandro & Simonton, 2010; Over, 1982; Simonton, 2000b); and (c) generations might be gauged on role-model availability, political stability, and prevailing philosophical beliefs (e.g., Klingemann, Mohler, & Weber, 1982; Murray, 2003; Simonton, 1975). These measurements often depend on various at-a-distance methods, such as content analysis, a technique that often relies on sophisticated computer software. For example, computerized content analysis has been applied to poetry, plays, music, and even scientific journal titles and abstracts (e.g., Martindale, 1990).

4. *Statistical analysis*—Because historiometric methods are necessarily correlational, researchers will seldom employ statistics most commonly seen in analyzing experimental data, like analysis of variance. Otherwise, the full range of correlational methods are available to the investigator: reliability and validity tests; multiple regression, path analyses, and structural equation models (including latent variables); exploratory and confirmatory factor analyses; cluster analysis; time-series analyses and multi-level models; etc. Because such research will often include a time dimension, cross-lagged correlation analyses may be used to make quasi-experimental causal inferences (e.g., Simonton, 1976b, 2017). In addition, historiometric data has also been used to evaluate mathematical models via regular goodness-of-fit tests (e.g., Simonton, 1997a).

At a superficial level, historiometric publications will look very similar to psychometric or experimental publications. The similarity is especially conspicuous when the investigator makes no attempt to identify the specific creative geniuses in the sample. The latter anonymity is particularly common in large-sample historiometric inquiries in which N runs into the hundreds if not thousands of cases (e.g., $N = 15{,}618$ in Simonton, 1980). Then specifying the source of the sample must suffice. Only when the sample sizes are smaller might the cases be named, most often in an appendix (e.g., Simonton, 2014b). Omit the appendix, and the so-called "participants" might as well be school children or college undergraduates rather than Albert Einstein or Pablo Picasso! Nevertheless, because the subjects of historiometric inquiries can always be exactly identified, the approach enjoys one distinct advantage over standard methods: In principle, historiometric research is always exactly replicable (Simonton, 2014c). In fact, historiometric researchers will sometimes replicate and extend prior research using precisely the same sample and variables (e.g., Simonton, 1976a; Simonton & Song, 2009). For other methods, that usually cannot be accomplished without access to a time machine!

Conclusion

Historiometric methods do not constitute the only approach to the empirical study of eminent individuals, including creative geniuses, it does represent the only technique designed to yield scientific results comparable to those generated by standard methods (Simonton, 1999). Unlike psychobiography, for example, which provides a psychological analysis of individual geniuses, historiometric research is multiple-case, quantitative, and nomothetic in

design (cf. Schultz, 2014). Its explicit purpose is to discover the general laws or principles behind historic geniuses rather than the idiosyncrasies of any particular genius. As will become evident in a later chapter, the historiometric literature has created a rich set of findings on the psychology of genius, including the social psychology of creative genius.

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3

Assessing Creativity with the Consensual Assessment Technique

John Baer and James C. Kaufman

Imagine you want to determine which poets of a group are the most creative. Let's assume these are all poets about whom you know very little. How might you go about determining who among them are the more creative poets?

Would you give them a "How many uses can you think of for a brick?" type of creativity test that scores responses based on the number of ideas the test taker produces and how usual those ideas are? This could allow you to rank order the poets from most to least creative. Or might you instead give them a series of personality tests and compare their scores with those of people known to be highly creative? This might give you a ranking of who among the poets have the more creative personalities.

Or else maybe you could interview the poets to ascertain the procedures they use (e.g., any idea-generating heuristics like brainstorming they employ, any artificial constraints they impose on themselves, any environmental choices they make that they believe enhance their powers) and compare their responses to the procedures that have been used by highly creative people in the past? This kind of interview might shed light on which poets have the better approaches to producing creative ideas. For poets famous enough to have

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left behind a significant body of published work, one might employ historiometric methods—statistical analysis of retrospective data—but this would be limited to comparisons of poets of considerable stature for whom such data exist.

Any of these three approaches might tell you something about the poets' creativity, but none of them is the obvious way to go. Why not just ask a group of poetry experts (e.g., other poets, editors of poetry anthologies, poetry teachers, and poetry critics) to judge the creativity of the poems that each of the poets has written?

This last option is how the Consensual Assessment Technique (CAT) works. Initially developed by Amabile (1982, 1983, 1996), the CAT assesses creativity by asking experts to rate the creativity of a set of artifacts from any domain. Virtually any domain can be tested this way, including recipes, engineering designs, dance performances, artworks, scientific theories and experimental designs, mathematical theories, advertising campaigns, and musical compositions. The experts in the domain in question work independently to rate the comparative creativity of all the artifacts in the set. In the example that opened this chapter, a group of poetry experts might each be asked to rate all of the poems in the set from most to least creative, or else they might be directed to sort them into piles based on levels of creativity. There's no magic number of "piles," but somewhere between five to nine is a fairly common range; too few and there is little sorting being done, and too many will be almost the same as rank ordering all the poems or other artifacts.)

The artifacts are judged in relation to each other only, not to some external or previously established standard or ideal. The experts in CAT assessments work independently and do not have opportunities to communicate or influence one another's judgments. Nevertheless, in domain after domain, the experts tend to agree. The inter-rater reliability is typically quite high, most often 0.80 or higher; these high levels of agreement have been found in numerous studies (Amabile, 1982, 1983, 1996; Baer, 1991, 1993, 1994, 1996, 1997, 2016; Baer, Kaufman, & Gentile, 2004; Hennessey, 1994; Hennessey & Amabile, 1999; Kaufman, Baer, & Cole, 2009; Kaufman, Baer, Cole, & Sexton, 2008; Kaufman, Baer, Cropley, Reiter-Palmon, & Sinnett 2013; Kaufman, Baer, & Gentile, 2004; Kaufman, Evans, & Baer, 2010).

Inter-rater reliability is a measure of reliability, of course, not validity. This distinction is important to keep in mind when using the CAT. The CAT's reliability is indeed assessed via inter-rater reliability measures like Cronbach's alpha, but the CAT's validity is ensured by this reliability occurring *only when expert judges* in a domain assess the creativity of products from that domain. It is this expertise that speaks to the validity of the CAT. Whatever counts as

creative in a domain is both defined and attested to by the combined expertise of the raters. Novice opinions may be a metric of popularity, but their thoughts are only related to creativity to the extent that they can convince the opinions of the gatekeepers and decision-makers in that field. Change happens in all domains, of course, including changes in what counts as creative. But change of that kind happens only when the combined expertise of the domain changes. Outsiders (nonexperts) can become insiders (acknowledged experts), of course, and newcomers to a domain may be the most likely to initiate changes in what counts as creative (or even acceptable) in a domain. But the argument that experts define the domain—and determine what is creative in that domain—remains true even as such changes occur. This process of change is rarely a rapid one. Kuhn, quoting Planck, suggested that new paradigms only get widely accepted as those who held earlier views leave the field: "Max Planck, surveying his own career in his *Scientific Autobiography*, sadly remarked that 'a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.'" (Kuhn, 1962/1970, p. 151).

The CAT has been called the "gold standard" of creativity assessment (Carson, 2006), and for good reason. Most measures are either general, artificial, or reliant on additional constructs (such as intelligence). How else would one test the creativity of poets? Imagine if a new creativity assessment came out and the scores for members of a domain (such as poetry) disagreed with the combined, independent judgment of experts in that domain. What could that discrepancy possibly mean? If one assumes that there is no absolute objective standard for determining the creativity of works in a domain, the judgment of the experts in that domain matters more than the results of some externally imposed rubric.

High inter-rater reliabilities thus vouch for the CAT's validity, therefore, only when experts in the domain in question serve as judges. Agreement among non-experts tells us nothing about the validity of a CAT assessment, however. Would it make sense to ask non-mathematicians to vote on who should be awarded the Fields Medal in mathematics? In fact, research has shown that the judgments of experts and novices in many domains vary considerably (see Kaufman & Baer, 2012, for a more detailed overview). If a group of novices is large enough, there may be some level of inter-rater agreement (e.g., Kaufman et al., 2008, 2009, 2013). But if those judgments do not accord with the judgments of experts (and they often do not), such assessments are not valid measures because it is only the understanding and mastery that experts in a domain bring to the task—expertise that essentially defines

the standards of the domain—that speaks to the validity of the assessments (Kaufman et al., 2008, 2009; Lee, Lee, & Young, 2005). Indeed, novices might even agree on who should get the Fields Medal, even though they would certainly not understand the mathematics. Other novices might agree on which works of abstract art are the most creative, even though they have no background in the field; yet another group of novices might agree on which essays about Chaucer's *Canterbury Tales* are more creative, even though they do not understand Middle English. But what would such agreements mean? Inter-rater reliability alone tells us nothing about validity unless the judges are experts in the domain in question.

The experts used in CAT assessments need not be the most famous people working in their fields. For judging the everyday, garden-variety creativity typical of most creativity studies, the type of expertise required might include familiarity with the kinds of things novices in a domain typically create. For example, judges of the creativity of eighth-grade artwork might reasonably be art teachers and artists familiar with the work of students of that age. Artists whose work is hanging in the Metropolitan Museum of Modern Art are not needed (and would likely say no). Expertise includes knowing about the particular kinds of things being judged.

Can non-experts ever be used in accurate CAT assessments? Yes, but only under specific conditions. The basic rule is that if non-experts can be shown to produce results that consistently accord with those of experts in a domain, those judgments (being essentially the same) can replace those of experts. Typically, however, pure novices do not show such overlap. Instead, when agreement is found it is for people who have a certain amount of knowledge, training, or ability in a domain, who are more accurately called quasi-experts. And in fact it has been shown in some domains (but not others) that quasi-experts—people with some level of training or skill in a domain but not (yet) at the level of being called experts—can be substituted for true experts without significantly affecting the ratings (Kaufman et al., 2008, 2009, 2013; Lee et al. 2005).

The CAT focuses on creative products, which is just one of the four P's in the classic 4P Model of creativity (Rhodes, 1961, 1987). All four are of interest, of course, but it's worth remembering that three of these four P's (person, process, and press) are really of interest only because of the fourth, product. A press (environment) that nurtures creativity, a thinking process or heuristic that leads to creativity, or a personality trait that promotes creative performance are creativity-relevant only because of their association with creative performances, ideas, or products. If an environment, process, or personality trait is no more likely than chance to lead to more creative outcomes, then it

has no special relationship with creativity. As Csikszentmihalyi (1999) argued, "If creativity is to have a useful meaning, it must refer to a process that results in an idea or product that is recognized and adopted by others. Originality, freshness of perspective and divergent-thinking ability are all well and good in their own right as desirable personal traits. But without some sort of public recognition they do not constitute creativity… The underlying assumption [in all creativity tests] is that an objective quality called 'creativity' is revealed in the products, and that judges and raters can recognize it" (p. 314). The CAT focuses on creative products, but it can nonetheless be used to learn about creative processes, presses, and personalities by showing which of these tends to be associated with what it is the CAT judges: creative performances or products of some kind.

The CAT has been shown to work well cross-culturally, although judges from different cultures might vary somewhat in the degree to which they value some aspect of a given set of artifacts. What is considered creative in China, for example, may not exactly match what is deemed creative in the United States, Japan, Saudi Arabia, or South Korea (some of the countries where these comparisons have been made). For example, consider novelty and appropriateness, two key elements of creativity. Paletz and Peng (2008) found that raters from Japan, China, and the United States all valued novelty, but Chinese judges placed less importance on appropriateness. Niu and Sternberg (2001) found that Chinese judges generally gave higher creativity ratings than judges in the United States. It is interesting, however, that despite these minor cultural differences, CAT ratings of the same artifacts typically vary little across cultures (Chen et al., 2002; Hennessey, Kim, Guomin, & Weiwei, 2008; Paletz & Peng, 2008; Rostan, Pariser, & Gruber, 2002).

These cross-cultural differences, minor though they appear to be, actually highlight the value and usefulness of the CAT. To the extent that cultural differences exist in what it means to be creative in a given domain, the CAT would appropriately yield somewhat different ratings for the same artifacts in different cultures. The CAT thus makes possible such comparisons. In the same way, CAT ratings might change over time, just as the judgments of experts in a domain change over time (Csikszentmihalyi, 1999). Creativity is neither universal or unchanging, and CAT judgments should (and do) reflect this. CAT ratings assess what is creative at a given point in time and in a given culture.[1]

[1] It is beyond the scope of this chapter, but in some domains the question of who are appropriate judges is an important and complex one. In judging movies, for example, the Academy Awards, the Directors' Guild Awards, and the People's Choice Awards may come to different conclusions, and for some domains, such as judging the creativity of cartoon captions, it is not clear that there is any generally recognized group of experts. See, e.g., Glăveanu, 2012, and Kaufman, Baer, and Cole, 2009.

The CAT has proven useful in testing theories of creativity in part because it is not itself based on a particular theory of creativity. In contrast, most creativity tests in the past have assumed that what they were testing is *general* creativity—creative-thinking skills that could be applied in virtually any domain. Consider the Torrance Tests of Creative Thinking (TTCT), which are by far the most widely used creativity assessments available (Kaufman, Plucker, & Baer, 2008; Torrance & Presbury, 1984). Even though they come in two versions, figural and verbal, Plucker (1998) noted that "[N]o assumption is made that performance is specific only to the task or content area addressed in a particular divergent-thinking test. Even the creation of figural and verbal versions of the TTCT is not an acknowledgment [of that possibility]" (p. 179). That makes them unusable for the purpose of determining whether or not creativity is domain general (as these tests assume), or if the skills underlying creative performance are different in different domains (domain specific).

The CAT makes no such assumptions and is completely agnostic regarding the domain generality or domain specificity of creativity. By their nature, CAT assessments are of creativity in a particular task (and thus in a particular domain). However, the CAT's creator, Amabile (1983), initially developed and employed the CAT for research that ignored domains. Her initial research focused on task motivation and seemed to assume that what was found about motivation using poetry-writing or collage-making as her measure would also be true of motivation for all other creativity-relevant tasks. But even though one *can* interpret CAT scores as domain-general measures, that is an assumption of the user, not of the CAT itself. The CAT does not force either a domain-general or domain-specific interpretation. This flexibility has made it possible to use the CAT productively in scores of studies that have focused on whether creativity is domain general or domain specific. As Plucker (1998) noted, the research on the CAT has been nearly universal in favoring domain specificity, although he also noted that "creativity checklists and other traditional assessments suggest that creativity is content general" (pp. 179–180). For a summary of both CAT-based and other specificity/generality research, see Baer (2016.)

The CAT can also be used to judge creative performance in contests, program admission, or other high-stakes individual assessments (Baer & McKool, 2009, 2014). Just as gender-blind auditions for orchestras have allowed judges to focus on musicianship—and in doing so have removed one important source of gender bias that had hindered women's selection for coveted positions[2]—creativity assessments using the CAT can reduce a variety of

[2] This change in orchestra auditions has had a major impact, but it should be noted that many barriers to gender equality in orchestras remain; see, e.g., Phelps, 2010.

biases that may occur if someone is being assessed by a teacher or supervisor. For example, when products are rated with names visible, bias can occur. Curiously, gender bias can be found in both directions. Kaufman, Baer, Agar, and Loomis (2010) found that poems seemingly written by Caucasian females received the highest raters, whereas Lebuda and Karwowski (2013) found a bias for male names. However, there are generally no (or inconsistent) differences by gender (see Baer & Kaufman, 2008, for overview). In terms of ethnicity, although measures of IQ and achievement often show biases for Caucasians (Kaufman, 2010, 2015), creativity measures such as the CAT do not show differences by ethnicity (e.g., Kaufman et al., 2004, 2010). When creativity is included as part of college admissions, it is unsurprising that CAT-like methodology is used (e.g., Sternberg, 2010).

The CAT is the "gold standard" of creativity assessment, but does that mean that no other creativity assessment approach can be as valid? Of course not. Different approaches might be more appropriate for different purposes. For example, although self-reported creativity (like self-reports in general) may have questionable validity in high stakes assessment, if what one wants to understand is how research participants view their own creativity, self-reports would be more appropriate than actual assessments of creative performance. This approach has indeed been employed by researchers exploring just how accurate self-assessments of creativity are: the CAT was used to gauge actual creativity, and self-assessments were used to measure how creative participants think they are (Kaufman, Beghetto, & Watson, 2016; Kaufman et al., 2010).

But the CAT's value isn't limited to research focused on creative performance. It can also be used, either alone or in conjunction with other assessment approaches, to learn about some of the qualities (e.g., environments, thinking skills, problem-solving heuristics, personality traits) that might lead to creative performance in a domain. The CAT doesn't assess the creativity of environments, thinking skills, problem-solving heuristics, or personality traits. But by assessing the actual CAT-based creative performance of (a) subjects working in different environments, (b) subjects with varying levels of certain thinking skills, (c) subjects employing different problem-solving heuristics, and (d) subjects with differing personality traits, one can infer which of these appear to be associated with actual creative performance in a given domain or circumstance.

The "gold" of the "gold standard" description suggests that the CAT may be the best creativity assessment technique, but it also hints at a weakness of the CAT: it is very expensive, both in terms of time and resources. Not that anyone controls the CAT or sells it—it's free for anyone to use—but one

needs groups of expert judges to rate the artifacts, and one will normally need to pay experts for their work. The fact that in using the CAT the creativity of actual artifacts is judged also means that the artifacts themselves must exist. In most research studies, therefore, participants must first create those artifacts, which may take considerable time and effort in most domains. Even if using quasi-experts, anticipate a significant expenditure of time and resources to be used for obtaining the ratings.

The CAT has one more significant limitation: it cannot yield standardized scores the way IQ and many achievement tests can. The creativity of the artifacts, ideas, or performances in a group is judged in relation to each other, not some pre-established standard. If one uses the CAT on two sets of artifacts from the same domain—for example, two sets of 50 poems—and the poems are rank ordered from most to least creative, in each set there will be a most creative and a least creative poem (and 48 poems ranked ordered in between). There is no way to know, however, based on these CAT ratings, if the poems in one set are more or less creative than those in the other set (unless one conducts further research, such as having a new groups of experts rate the creativity of either all 100 poems or a random subsample from each group). Similarly, if experts rated the poems in the two groups separately on a 1–5 (or any other) least-most creative scale, one cannot compare a rating of 4 from one group with a rating of 4 in the other, because the poems in each group were compared only to other poems in that group. This imposes some restrictions on how CAT ratings can be used.

For most purposes, however, standardized scores are not needed. (The notion of standardized creativity assessments seems almost oxymoronic, does it not`?) For groups of artifacts that are too plentiful all to be judged by the same group of experts, however, there are techniques to score the entire group, such as pulling a few artifacts from each group and using these to equate the ratings from various subgroups, or randomly assigning artifacts to subgroups under the assumption that the overall creativity in all subgroups is likely to be similar (Baer & McKool, 2009, 2014). Similar kinds of equating methods are used, on a larger scale, to compare scores on different forms of standardized tests like the SAT (Dorans, 2008; Livingston, 2014).

We care about creativity, which means we must care about how it is assessed. Creativity tests that lack validity lead to experimental results that we cannot trust (and which tend to contradict one another; Baer, 2011, 2016). Using the CAT—the "gold standard"—is resource-intensive, as noted above. But might it not be wiser to have a smaller total number of creativity studies based on the most valid measures than to have a larger number of studies whose results cannot be trusted?

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4

An Introduction to Social Network Analysis for Creativity Research

Alexander S. McKay

Social network analysis (SNA), at its roots, is a way of thinking about social life by focusing on members of a network and the relationship between those members. Within the social sciences, researchers have used SNA to answer a range of questions on topics like information sharing, health behaviors, power, and similarity-attraction/homophily (Borgatti, Mehra, Brass, & Labianca, 2009). These researchers, primarily in sociology and management, have also used SNA to examine how social network factors relate to creativity and innovation (Baer, Evans, Oldham, & Boasso, 2015; Perry-Smith & Mannucci, 2015; Uzzi & Spiro, 2005). Across these studies, a general finding has emerged: social networks play an important role in individual-level creativity and innovation.

When focusing on the *social* side of creativity research, *social* network analysis stands as a methodological and analytical approach with potential to address many pressing questions (Perry-Smith & Mannucci, 2015; Perry-Smith & Shalley, 2003). Indeed, multiple theories emphasize the importance of social factors that underlie creativity (Amabile, 1983; Glăveanu, 2015; Simonton, 1984; Woodman, Sawyer, & Griffin, 1993) and Simonton (1984) argued that "A successful 'social psychology of creativity' demands that the creative individual be placed within a network of interpersonal relationships and group influences" (p. 1273). Thus, to gain a better understanding of the

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"social" in creativity, SNA is one methodological approach to examine how a creator's social network influences their creativity and innovation.

Although social networks and creativity have been studied in the organizational and sociology literature, it has received less attention within dominant creativity journals (e.g., *Psychology of Aesthetics, Creativity, and the Arts*; *Journal of Creative Behavior*; *Creativity Research Journal*). However, this is changing as more creativity researchers are introduced to SNA. The goal of this chapter is to provide an overview of SNA and its application to research on creativity and innovation. To accomplish this goal, I discuss the building blocks of social networks and introduce important terminology. Second, I provide an overview of SNA's mathematical foundations. Third, I discuss the importance of defining network boundaries when conducting network studies. Fourth, I define commonly used measures of SNA. Fifth, I discuss network visualization followed by software packages for conducting SNA research. Last, I provide suggestions on how a network approach can be used to examine how social networks relate to creativity by identifying different lenses network researchers can use. Because this edited volume focuses on the social aspects of creativity, the chapter emphasizes research conducted using people rather than research on neural or mental lexicon networks (see Kenett, Beaty, Silvia, Anaki, & Faust, 2016; Kenett et al., 2018). This line of research, however, also provides important implications for a network approach at other levels of analysis.

Building Blocks of Social Networks

Social networks are social systems made up of nodes and relationships among those nodes (Borgatti, Everett, & Johnson, 2013). Nodes, or actors, can be a variety of things like people, teams, organizations, websites, words, or classrooms. The total number of nodes in a social network is referred to as network size. The nodes in a network often have different attributes, or characteristics, that distinguish them. If nodes were people, they could differ based on categorical traits like gender or race or on continuous traits like age or personality. Figure 4.1 provides a simple, directed graph to help introduce the concept of nodes and edges, or ties/connections, among nodes.

Focusing solely on nodes and their attributes is a more traditional methodological and analytical approach (e.g., how personality relates to creative performance). An important principle of SNA is that the relationships among nodes influence a node's behavior, which is what distinguishes a network approach from traditional approaches (Felmlee, 2000; Marin & Wellman,

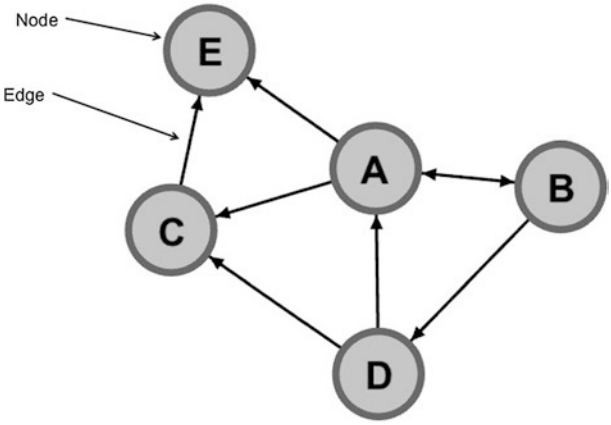

Fig. 4.1 A simple directed graph with nodes and edges labeled

2011). In other words, a network approach emphasizes the relationships among nodes and the larger network a node is part of, arguing that a node's behavior is interdependent and influenced by other nodes in the network. Because of this interdependence, researchers often must utilize alternative methodological and analytical approaches to study social networks.

The connections among nodes are called edges, ties, connections, or lines. Edges form the relationships among nodes and can indicate friendship, information exchange, collaborations, citations, marriage, kinship, or other various social connections (Wasserman & Faust, 1994). These relationships can be dichotomous (e.g., married or not married) or valued/weighted (e.g., friendship strength, frequency of information exchange). Edges can also be undirected or directed. Undirected edges refer to those that are bidirectional (e.g., coauthors or kin), whereas directed edges have a specific direction (e.g., citations, parent of). For example, in Fig. 4.1, the edge between A and B is undirected (the arrow goes both ways) and the labeled edge between C and E is directed (the arrow goes from C to E, but not E to C). Networks that have all undirected edges are undirected networks. Networks that have all directed edges or a mix of undirected and directed edges are directed networks like the one depicted in Fig. 4.1. In order to understand the "connectedness" of a network, researchers often calculate network density, which is the proportion of edges to all possible edges (Felmlee, 2000).

There are four categories of relationships among nodes: similarities, social relations, interactions, and flows (Borgatti et al., 2009). First, similarities can be based on location (i.e., spatial or temporal space), group membership (i.e., members of the same club or attend the same events), or attributes (e.g., similar gender or attitude). Second, social relations refer to either relational roles

or relational cognitions. Relational roles can be relationships like kinship (e.g., parent of, sibling of) or other roles (e.g., friend of, employee of). Relational cognitions can be affective (e.g., liking or disliking) or cognitive (e.g., knows). Third, interactions are behaviorally based ties between nodes (e.g., talking to, providing advice, helping, harming). Last, flows refer to exchanges or transfers between nodes (e.g., information, resources).

There are two types of network research designs used in SNA (Borgatti et al., 2013). First, sociocentric networks, or "whole networks," are what most people think of with SNA. Whole networks include all nodes and edges within a specified boundary. For example, a researcher might create a network of academic researchers working in a single department and information sharing ties among these researchers. Second, egocentric networks, or "personal networks," are stand-alone networks. In personal networks, there is a focal "ego" node and other nodes, or "alters," which are the nodes connected to an ego. For example, in a egocentric network study, respondents might be asked to list their close and distant friends (e.g., Kéri, 2011). Importantly, researchers who collect whole network data can create multiple personal networks from this whole network (i.e., a network with an ego and alters). However, it is not always possible to create a whole network from multiple personal networks because personal networks might be completely disconnected from one another.

Mathematical Foundations of SNA

SNA's mathematical foundation is in graph theory and matrix algebra (Borgatti et al., 2013, 2009). Graphs are one way to understand networks mathematically. In this case, graphs are mathematical objects, not diagrams. A graph is made up of a set of vertices (nodes or actors) and a set of edges that connect the vertices to each other. When two vertices are connected, the vertices are "adjacent." For example, consider the graph $G(V, E)$ displayed visually in Fig. 4.1, which has nodes and edges labeled. This graph has a set of five vertices V = {A, B, C, D, E} and a set of eight edges E = {(A, B), (A, C), (A, E), (B, A), (B, D), (C, E), (D, A), (D, C)}. Note that the connection between A and B is counted twice because of the edge from A → B and the edge from B → A. Graphs are often composed of edges with one relational type. For example, one graph might contain friendship ties and another contains knowledge sharing ties. Although there might be similarity between the two networks, they might have different structures and relate to different outcomes.

Table 4.1 Adjacency matrix of Fig. 4.1

	A	B	C	D	E
A	0	1	1	0	1
B	1	0	0	1	0
C	0	0	0	0	1
D	1	0	1	0	0
E	0	0	0	0	0

Matrices are another way of examining networks mathematically. Table 4.1 is an adjacency matrix of Fig. 4.1. The rows and columns of Table 4.1 represent nodes and a value of 0 or 1 within the cells represent whether two nodes are connected ("1") or unconnected ("0"). Adjacency matrices are read from rows to columns. Because Fig. 4.1 is a directed graph, the cells below the diagonal do not match the cells above the diagonal. If the graph were undirected, the matrix would be symmetrical (i.e., the cells below and above the diagonal would match). If a researcher has two matrices of the same size (i.e., the same number of nodes), matrix algebra can be used to create compound social relations.

The adjacency matrix in Table 4.1 is a single-mode matrix: the rows and columns have the same set of nodes. Notably, a matrix can have a different number of rows and columns. These matrices are called two-mode matrices: the rows and columns refer to different sets of nodes. An example of a two-mode matrix is an affiliation network. That is, people (first mode) attend certain events (second mode). The assumption here is that people who are affiliated by some event are similar to each other and connected through one or more events. Two mode matrices are often collapsed into a single-mode matrix for ease of analysis (Borgatti et al., 2013).

This section was meant to provide a brief discussion of SNA's mathematical foundations. Many terms (e.g., paths, walks, components, geodesic distance) are not discussed for length. For those interested in learning more about SNA's mathematical foundations, readers are referred to Wasserman and Faust (1994).

Defining Network Boundaries

When conducting network studies, researchers must determine what nodes to include within a network. Often times, social networks have "fuzzy" boundaries making it difficult to identify what the boundaries are. This is called the boundary specification problem. Laumann, Marsden, and Prensky (1983) identified three approaches to define a network's boundary. The first is a position-based

approach. This approach focuses on nodes that are members of a particular organization or hold formal positions within a given field. For example, creating a network with employees within a single organization or members of a professional association. The second is an event-based approach. This approach focuses on nodes that participated or attended an event. For example, people who have attended a professional conference during the past five years. The third approach is a relation-based approach. While the first two approaches define boundaries based on the nodes, the third approach focuses on defining network boundaries based on the edges. For example, a network based on collaborations in a scientific field or an information exchange network.

The three approaches above are not mutually exclusive. Rather, more than one approach is often used. For example, researchers might create an information-sharing network (relation-based approach) within a single organization (position-based approach). What approach a research uses should be determined by the research question. When research questions are written to focus on naturally forming groups, it is easier to determine the boundaries of the network.

As mentioned, networks often have "fuzzy boundaries," which can introduce measurement error into network studies. For example, group members might think one person is not a group member when they are (e.g., a temp worker in an organization) or that a group member is a member when they are not (e.g., a colleague's friend not working in the organization). Additionally, group members might fail to report some of their ties to other group members or incorrectly report ties that do not exist. These errors are referred respectively as false negative nodes, false positive nodes, false negative edges, and false positive edges (Wang, Shi, McFarland, & Leskovec, 2012). Wang and colleagues provide an overview of these four error types and discuss two additional error types: false aggregation and false disaggregation. False aggregation refers to mistakenly treating two different people as the same person and false disaggregation refers to treating one person as two different people. Overall, researchers should be mindful of how they define network boundaries based on their research question. Additionally, to improve accuracy, researchers should utilize various strategies, like formal lists and snowball sampling techniques simultaneously to determine a network's boundary (Borgatti et al., 2013).

Commonly Used SNA Measures

There are various measures and techniques used in SNA to examine a node's location within a network and how this location relates to various outcomes. These measures and techniques include, but are not limited to, centrality,

equivalence, and subgroups. Centrality has received a great deal of attention in the SNA creativity literature and will be the primary focus of this section. Equivalence and subgroups have received less attention in the SNA creativity literature. Because of their limited use, I will not discuss equivalence here and refer readers to Borgatti et al. (2013) and Wasserman and Faust (1994). I will, however, discuss subgroups as they have important implications for network research.

Centrality The most common SNA measure studied is centrality. Centrality refers to a node's position within a network. Centrality has been interpreted as or served as a proxy for prominence, influence, status, or advantage within a network (Borgatti et al., 2013; Freeman, 1978; Wasserman & Faust, 1994). Thus, the definition of centrality is quite general. However, these terms are not properties of centrality itself, but rather consequences of centrality (Borgatti et al., 2013). These terms also reflect positive ties (e.g., information sharing, support, trust) rather than negative ties (e.g., distrust, opposition, avoidance). Researchers often examine centrality as a predictor of various outcomes like creativity/innovation. There is also research examining antecedents of centrality like personality (e.g., Fang et al., 2015; Klein, Lim, Saltz, & Mayer, 2004).

Multiple types of centrality measures exist with different conceptualizations of a node's network position. These centrality measures are predicted to differentially relate to various outcomes. I focus on more commonly used centrality measures, especially within the SNA creativity literature. To illustrate the centrality measures discussed, Fig. 4.2 provides a visualization of an undirected graph and Table 4.2 includes centrality scores for each node.

The simplest type of centrality is degree centrality (Borgatti et al., 2013; Wasserman & Faust, 1994). Degree centrality is the number of connections a node has. Looking at Fig. 4.2, Pam has six connections (Andy, Dwight, Robert, Quinn, Jan, & Ryan) and Ryan has two (Pam & Jan). When a network is directed, degree centrality is split into "indegree" and "outdegree" centrality. Indegree is the number of ties going into a node and outdegree refers to the number of ties going out of a node. Degree centrality does not require collecting data for a whole network. Rather, a researcher can use egocentric networks to calculate degree centrality. This measure of centrality also works with valued/weighted data. Valued degree centrality can be the average of all ties (indegree or outdegree) or it might represent the number of connections between two people (e.g., number of times two people have collaborated on scientific publications).

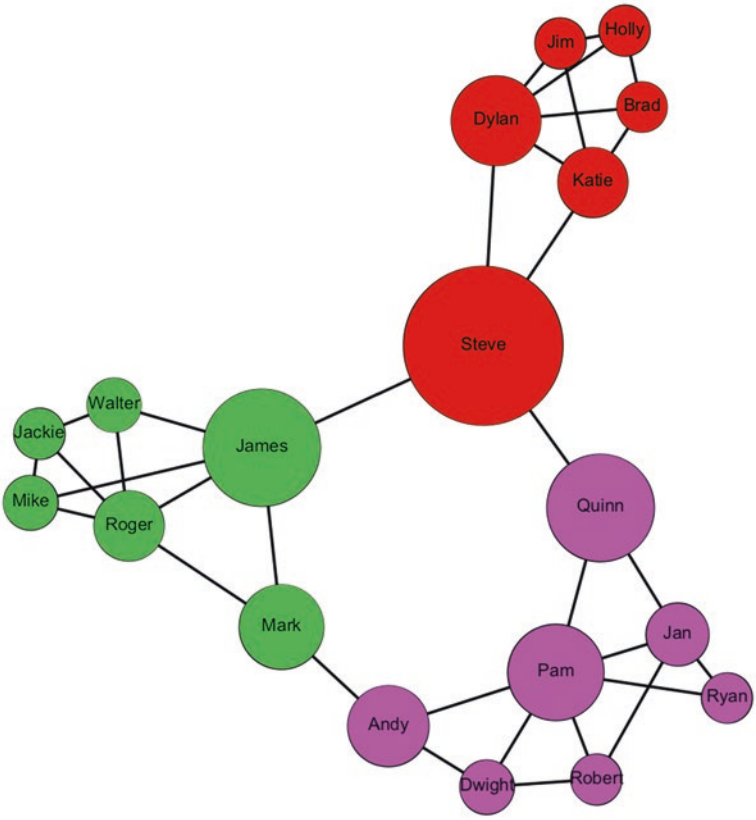

Fig. 4.2 An undirected graph with three subgroups. Node size is based on betweenness centrality scores (larger nodes indicate higher betweenness centrality). Group 1 is in green (light gray), Group 2 is in red (dark gray), and Group 3 is in fuchsia (gray)

Another form of centrality is eigenvector centrality (Bonacich, 1972). Eigenvector centrality is similar to degree centrality in that it considers the number of ties a node has. However, eigenvector centrality extends beyond degree centrality by considering the degree centrality of a node's alters. That is, how central a node is depends on the number of their own connections and the number of their connections' connections. For example, in Fig. 4.2, consider Mark and Dwight, who both have a degree centrality score of three. Mark is connected to people with five (Roger), five (James), and three (Andy) connections. Dwight is connected to three people who have six (Pam), three (Andy), and three (Robert) ties themselves. Thus, Mark has a higher eigenvector centrality score (0.22) than does Dwight (0.16) because Mark's connections have more connections than do Dwight's connections. In reality, Mark

Table 4.2 Centrality scores for nodes in Fig. 4.2

Name	Degree	Eigenvector	Closeness	Betweenness	Group
Roger	5	0.33	0.38	14.33	1
James	5	0.34	0.44	48.25	1
Mark	3	0.22	0.40	24.75	1
Jackie	3	0.21	0.29	0.33	1
Mike	3	0.23	0.33	2.92	1
Walter	3	0.23	0.33	2.92	1
Dylan	5	0.29	0.38	28.67	2
Brad	3	0.19	0.29	0.33	2
Katie	4	0.25	0.38	14.33	2
Holly	3	0.17	0.29	0.33	2
Jim	3	0.19	0.29	0.33	2
Steve	4	0.28	0.49	78.75	2
Quinn	3	0.20	0.43	41.25	3
Pam	6	0.27	0.39	32.92	3
Dwight	3	0.16	0.33	2.92	3
Ryan	2	0.12	0.29	0.00	3
Andy	3	0.17	0.36	22.25	3
Robert	3	0.17	0.30	0.50	3
Jan	4	0.20	0.35	8.92	3

Note: Closeness centrality scores were normalized to ease interpretation

and Dwight's eigenvector centrality scores are very similar. This example was meant to illustrate how a node's eigenvector centrality score is determined. Eigenvector centrality can also be used for directed networks and valued edges. For directed networks, eigenvector centrality is split into in-eigenvector and out-eigenvector centrality. Although this measure can be used for valued edges, edges must be positive: there cannot be any negative edge values to calculate this centrality measure.

A third type of centrality is closeness centrality. Closeness centrality extends beyond a node's immediate connections (degree) or a node's connections' connections (eigenvector centrality) by focusing on the distance from one node to all other nodes in a network. Notably, closeness centrality is considered an inverse centrality measure with larger scores indicating nodes are on a network's sides/periphery and smaller scores indicating nodes are in a network's center/core (Borgatti et al., 2013). To ease interpretation, scores are often normalized so larger scores indicate a node is more central in the network and smaller scores indicate a node is more peripheral (normalizing centrality scores is discussed below). To conceptualize closeness centrality, consider a piece of information being shared by a random node within a network. Nodes with a high closeness centrality score would likely receive this information before nodes with a small closeness centrality score. For example, in Fig. 4.2,

Steve has the highest normalized closeness centrality score. He is connected to some of the most important people in the network and bridges otherwise disconnected groups. If another person shared a piece of information, it would reach him quickly. Like degree and eigenvector centrality, it can be extended to directed networks and is split into "in-closeness" and "out-closeness." However, closeness centrality scores cannot be computed with valued edges.

Another commonly used measure of centrality is betweenness centrality (Freeman, 1977). Betweenness centrality emphasizes whether a node is along the shortest path between two other nodes in the network. Those with high betweenness centrality scores are located in a path between every pair of other nodes. Betweenness centrality is interpreted as a node's control over the flow of information. In Fig. 4.2, consider Steve (Group 2) and Ryan (Group 3). Steve is connected to James and Quinn, which bridges Group 2's connection with Groups 1 and 3. Thus, information shared in Groups 1 and 3 must pass through Steve before it can reach other members in Group 2. In other words, Steve has complete control over the flow of information in and out of Group 2. Ryan (Group 3), however, does not bridge any connections in the network. He is on the periphery of the entire network and of Group 3. Thus, he likely does not control the flow of any information. In Table 4.2, Steve has the highest betweenness centrality score and Ryan has the smallest. Like other centrality measures, it can be extended to directed networks, but only one betweenness score is calculated (scores do differ between undirected and directed networks). Similar to closeness centrality, betweenness centrality cannot be used with valued edges.

There are two considerations for all centrality measures discussed. First, unless valued edges are critical to a research question, it is often easier to dichotomize edges and then calculate centrality measures. With dichotomous edges, a researcher can compute all types of centrality measures and it eases the interpretation of some centrality scores. Second, centrality measures can be normalized. Normalizing centrality scores allows one to compare across networks of different sizes. Consider two networks: A and B. Network A has 10 nodes and one of those nodes has a degree centrality of five. Network B has 200 nodes and one of those nodes has a degree centrality of five. Although both nodes have a degree centrality of five, the size of the network influences whether five ties are influential. By normalizing scores based on the overall network size, a researcher can compare nodes across different networks. As mentioned, normalizing closeness centrality also makes these scores easier to interpret.

Subgroups Subgroups are smaller groups within a larger social network. These smaller groups contain nodes with ties among members and few ties with nodes that are outside of the group. For example, consider the three subgroups in Fig. 4.2. There are more ties among people within each subgroup than with people outside of each subgroup. Researchers often try to identify subgroups and determine what factors explain their formation. These factors might be shared beliefs, goals, or engaging in similar hobbies/activities.

A clique is one type of subgroup that is comprised of three or more nodes where all nodes in the group are directly connected. In Fig. 4.2, there are a number of three person cliques (e.g., Mike, Jackie, and Roger), but no four person cliques. In a directed network, all ties must be reciprocated to form a clique. Notably, a node can be a member of multiple cliques. It can be useful to distinguish nodes in multiple cliques versus nodes in one clique. The definition for cliques can be restrictive. That is, subgroups exist even when every node is not connected to all other nodes in the group. Because of the strict definition for clique, there are alternative techniques that ease the restriction on subgroup membership (e.g., N-cliques, N-clans, K-plexes). Hanneman and Riddle (2005) provides an overview of these types of subgroups as well as additional types.

Subgroups are often not the primary focus of SNA creativity research. However, examining different types of networks and subgroups within those networks can provide insights into how the network operates and whether certain subgroups or nodes are more influential. For example, research on small-world networks has implications for different subgroups. Specifically, it indicates that creativity is highest when there are strong ties within an immediate cluster/subgroup and there are some ties to other clusters/subgroups (Fleming, King, & Juda, 2007; Uzzi & Spiro, 2005). Thus, considering subgroups has important implications for both theory and practice.

Network Visualization

Researchers using a network perspective often create visualizations to better understand a network. These visualizations can be a powerful qualitative supplement to quantitative findings by highlighting certain network characteristics within a whole network. For egocentric networks, creating visualizations is not always necessary or useful because it will likely result in a large number of stand-alone networks.

Developing informative and useful network visualizations is difficult. There are multiple decisions to consider. Researchers must choose from various layouts and this decision is influenced by factors like network size, density, whether edges are weighted/unweighted, the research question, or the software package being used (see below). Adding to this difficulty, a layout that works for one network might not work for another. Layout refers to the position of nodes and edges in a network. A carelessly developed layout can result in interpretational errors and will communicate very little information. Thus, if using visualizations, it is important to spend time considering available options.

There are three primary approaches to network visualizations: layout algorithm approaches, ordination approaches, and attribute-based scatter plot approaches (Borgatti et al., 2013). First, layout algorithms are heuristic-based methods to visualize a network. Layout algorithms typically create quick visualizations by focusing on mathematical properties of the network and highlighting those properties (e.g., highlight dense or sparse areas within a network). There are dozens of layout algorithms to choose from and the availability of these algorithms varies across software packages. Moreover, researchers can adjust the mathematical parameters for these algorithms to customize their visualization to maximize utility communicating results qualitatively.

Second, ordination approaches use multivariate statistical techniques (e.g., principal components analysis, multidimensional scaling) that space nodes from one another based on edge-related factors. These factors can be edge weights, correlations among variables examined, or other properties like spatial distance. For example, McKay, Grygiel, and Karwowski (2017, p. 288) used multidimensional scaling to space the distance among nodes based on friendship tie strength. In this study, nodes closer together reported greater friendship strength and nodes farther apart reported weaker friendship strength.

Last, attribute-based scatter plots place nodes based on their attributes. That is, nodes are placed in the graph based on their scores on a given attribute. For example, node placement might be based on factors like intelligence, SES, or age. This approach is useful when examining how different attributes influence whether two people are connected.

In sum, creating network visualizations is a powerful way to supplement one's quantitative findings and can be interesting to readers. However, care must be taken to create visuals that are interpretable and communicate useful information. To help create these visuals, numerous tutorials are available online. Searching for and using these tutorials depends on the software package. Additionally, a useful way to learn is through trial-and-error. Working

with various types of networks with different types of ties will aid in learning how to create interesting and powerful visualizations.

Social Network Software Packages

Because social network data has both node-level and relational data, researchers often require specific software packages to handle this data and create visualizations. Most packages can do both data analysis and visualization, but some are better at one over the other. I discuss a few of the many packages available. The list below is not exhaustive: there are dozens of other packages available. Choosing a package depends on personal preferences and one's operating system.

One program for network analysis is UCINET (Borgatti, Everett, & Johnson, 2002). UCINET has user-friendly drop-down menus as compared to syntax driven programs (e.g., statnet in R). Hanneman and Riddle (2005) also wrote a free downloadable textbook with instructions for many of UCINET's functions. However, UCINET has changed/improved the functionality of some options since the textbook was written. Accompanying UCINET is a visualization package called NetDraw (Borgatti, 2002). This easy-to-use program has many options for network visualizations.

The program R also has a suite of free packages available through "statnet" (Handcock, Hunter, Butts, Goodreau, & Morris, 2003). These R packages are powerful for statistical analysis of social network with functionality ranging from calculating network properties and centrality scores, creating visualizations, and testing complex research questions and hypotheses using Exponential Range Graph Models (ERGMs). Unlike UCINET, R and the statnet packages are syntax driven and there are no drop-down menus. However, the documentation for statnet is thorough with lots of examples.

NodeXL is another network analysis and visualization package that works through Microsoft Excel (Smith et al., 2010). NodeXL can create powerful social network visualizations and calculate a variety of centrality measures and identify subgroups (and more). A notable feature of this software is its ability to access social media websites (e.g., Twitter, Facebook, YouTube), download networks from these websites, and create social media networks. This package is free; however, additional functions are available for a fee.

Another program that can create powerful visualizations is Gephi (Bastian, Heymann, & Jacomy, 2009). Gephi is a free, open-source package that has a lot of functionality for visualizing various social networks. There are options to calculate various scores (e.g., centrality), identify subgroups, and weight

nodes/edges based on a variety of attributes. Because it is open-source, new layout algorithm and statistical add-ons can be downloaded into the program. Although Gephi is a powerful visualization package with lots of customizable options, it does not have the functionality to test network hypotheses.

Types of Research Questions

Research questions using a network perspective differ from other perspectives. Specifically, rather than examining how factors like personality relate to creativity, researchers using a network perspective might examine how a person's location in the network (i.e., centrality) influences their creativity (e.g, Baer, 2010, 2012; Perry-Smith, 2006). Additionally, researchers have taken an interactionist perspective (Shalley, Zhou, & Oldham, 2004; Woodman et al., 1993), examining how network factors like centrality interact with personality and contextual factors to predict creativity and innovation (e.g., Baer, 2010; Kim, Shin, Shin, & Miller, 2016; Zhou, Shin, Brass, Choi, & Zhang, 2009). More recently, theory has highlighted how different node, centrality, and network properties might be important at different stages of the creative process (Perry-Smith & Mannucci, 2017). Below, I highlight some possible network approaches researchers can take and provide notable citations for those topics.

From a network perspective, researchers can focus on three or more levels of analysis: node level (e.g., do different types of centrality relate to creativity?), dyad level (e.g., do friendship ties between two people influence their decision to engage in creative activities?), or network level (e.g., how does an organization's innovative climate influence creative collaboration?).

At the node level, SNA and creativity studies often examine the relationship between different types of centrality and creativity. For example, focusing on degree centrality, empirical studies have examined how network size relates to creativity (e.g., Kéri, 2011; McFadyen & Cannella, 2004; McKay et al., 2017), finding that network size is moderately related to creativity/innovation (see also Baer et al., 2015). Additionally, a topic often studied is the relationship between relationship network strength and creativity, largely driven by Granovetter's (1973, 1983) strength-of-weak-ties theory. Strong ties (i.e., high network strength) are contacts that are emotionally close to a person and those a person interacts with frequently. Weak ties (i.e., low network strength) are more distant contacts that someone interacts with infrequently. This line of research has produced mixed findings. Sometimes strong ties are beneficial for creativity and other times weak ties are, and sometimes both are unrelated

(Baer, 2010; Perry-Smith, 2006; Rost, 2011). A recent meta-analysis examined the relationship between network strength and creativity finding a small-to-moderate positive relationship between network strength and creativity (Baer et al., 2015). This meta-analysis also indicated that moderating factors likely influence the relationship between network strength and creativity. A recent theory has also been proposed to account for these mixed findings (Perry-Smith & Mannucci, 2017).

Another large body of node-level SNA and creativity literature has focused on betweenness centrality and the omnibus term "brokerage" (e.g., Baer et al., 2015; Burt, 2011; Fleming, Mingo, & Chen, 2007). Betweenness centrality is arguably one of the most important types of centrality for creativity and innovation (Baer et al., 2015; Burt, 2011; Burt, Kilduff, & Tasselli, 2013). As mentioned, people high in betweenness centrality often control the flow of information, which gives them an advantage to how this information is shared and with whom. They also have influence over connecting otherwise disconnected people, serving as a gatekeeper to the generation and development of creative ideas. This centrality measure has received a lot of attention in the SNA creativity literature to better understand how and why brokers are so influential. Overall, meta-analytic findings indicate that brokerage is moderately positively correlated with creativity/innovation (Baer et al., 2015).

Other research at the node level has focused on a node's alters rather than the node itself. Specifically, Grosser, Venkataramani, and Labianca (2017) examined whether a node's innovative behavior was related to their problem solving network contacts' (i.e., alters) average creative self-efficacy and innovative behavior. The researchers found that the alters' average creative self-efficacy was positively related to a node's innovative performance. This relationship was mediated by the alters' average innovative performance.

At the dyadic level, researchers have examined whether people who perform similarly on a creativity task are more likely to report friendship ties (e.g., McKay et al., 2017). In Study 1, using a sample of high school students, they found similarity in creative performance scores did not predict friendship strength. In Study 2, using a sample of fifth grade students, however, they found people with similar creative performance were more likely to nominate each other as friends. In these studies case, edges were the outcome and creative performance similarity was a predictor. Notably, Study 1 used valued edges (friendship strength), whereas Study 2 used dichotomous edges. There are additional studies at this level, yet many research questions remain unanswered, which might provide insight into collaboration and creative performance.

At the network level, some research has examined how certain types of network structures influence creativity. Specifically, small world networks have been examined for how they influence creativity in a variety of settings (e.g., Fleming et al., 2007; Uzzi & Spiro, 2005). Additionally, a network perspective can be used to examine how interactions within small groups might influence group creativity. That is, how does the connectedness within small groups influence creative performance?

Conclusion

The network and creativity literature is quickly growing: more researchers are adopting a network perspective to better understand how social relationships influence creativity and innovation. Although a great deal of research has been conducted, primarily in the management and sociology literature, there is still much left to study. The goal of this chapter was to introduce readers to SNA. Through this introduction, I hope researchers will consider taking a network approach in future research to further inform the research community on the "social" in creativity and innovation.

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5

Those Days When People Are Creative: Diary Methods in Creativity Research

Marta Czerwonka

Studying *life as it is lived* (Allport, 1942, p. 56), although it sounds very appropriate, still seems to be challenging for researchers. Tracking people's everyday functioning and examining their ongoing experiences gained popularity in various fields of psychological studies. The idea of measuring the dynamic and changeable nature of behaviors, interactions, thoughts and moods in a natural context has been reflected in recent study designs and methods (i.e., Bolger & Laurenceau, 2013; Mehl & Conner, 2012). The daily diary method allows researchers to capture day-to-day processes and obtain repeated assessments of people's experiences within typical situations (Bolger, Davis & Rafaeli, 2003). How might this self-report measure, which allows for the temporal processes investigation unfolding in everyday environments, be beneficial and promising for creativity research? Why is it important for creativity researchers to "think real-time" (Schwarz, 2012), and thus adapt and develop real-time (or close-in-time) measurement? This chapter aims to identify the potential of the diary method to examine creativity contextually, with an emphasis on the methodological challenges discussed in this handbook. After a brief overview of the main features and advantages of diary method, I devote special attention to three issues: (1) research questions which can be answered with diary studies, (2) methodological and practical guidelines in

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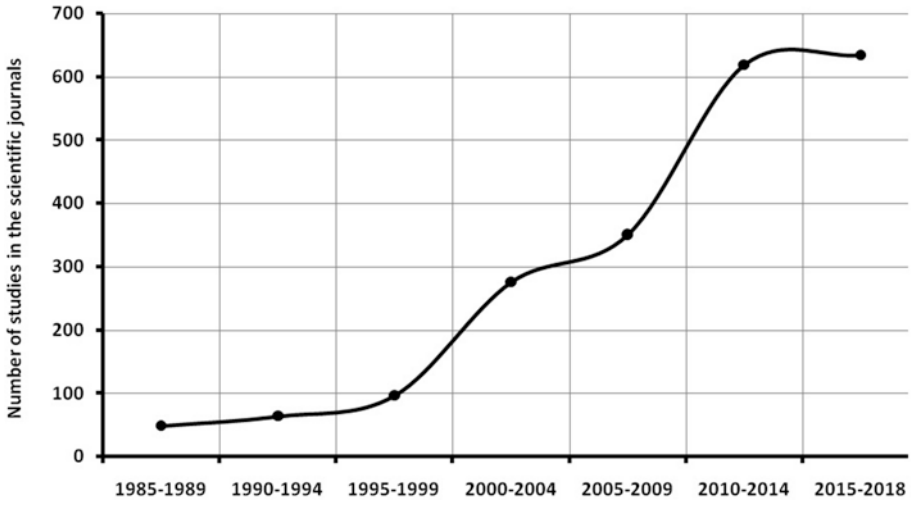

Fig. 5.1 Growth of research studies using diary methods from 1985 to 2018. PsycINFO was used to assessed number of studies selected only by the keyword *daily diary* and published in scientific journals

preparing diary designs and analyzing diary data, and (3) some final considerations and potential applications of the diary method in creativity research.

The Nature of the Diary Method and Current Use in Creativity Studies

Bolger and Laurenceau (2013) pointed that "One of the most exciting developments in social and behavioral methodology is the development of diary methods (…)" (p. 7). Indeed, researchers more intensively and largely use diary methods, as well as provide wide explanation for efficiently planning and implementing intensive longitudinal designs involving self-reports (i.e., Bolger & Laurenceau, 2013; Gunthert & Wenze, 2012; Iida, Shrout, Laurenceau, & Bolger, 2012). A number of studies collected based on a PsycINFO search using only the keyword *daily diary* indicates a rapidly growing body of research using this method (see Fig. 5.1).[1]

Its expanding popularity show that the advantages and benefits of diary designs are getting well recognized and understood (see Mehl & Conner, 2012). Diary studies allow researchers to measure people's behaviors or

[1] This figure presents re-analyzed and extended data originally demonstrated by Gunthert and Wenze (2012) and Bolger and Laurenceau (2013).

thoughts naturalistically – in the environment they usually inhabit (e.g., school, work). The power of the ecological momentary assessment (EMA) is defined by the ability to study constructs, for example everyday creativity, naturalistically, in the "real-world" (see Silvia, Cotter, & Christensen, 2017). Examining psychological or social phenomenon repeatedly *in situ* – natural settings – increases ecological validity. In addition, people report their activities, thoughts, and moods, in close temporal proximity to the actual occurrence of these phenomena. Researchers assess phenomena in close to or at the moment they occur, thus in the *"real-time"*. Finally, diary studies collect multiple, repeated measures per person, usually over relatively short periods of time. This means that the diary method allows for capturing temporal and individual variability or stability, and modeling of temporal dynamics and within-person processes (so-called idiographic) as they unfold "over-time". Moreover, using diary designs, we can analyze people's reaction relative to their own baseline, when specific situations occur and predict variation in within-person "reactivity" at the between-person level (Bolger et al., 2003). Taken together, diary studies are useful for detecting temporal dynamics of process and capturing both within- and between-variation in measured variables.

However, the frequency and popularity of diary designs is relatively low in creativity research. To date, only in few studies diary methods have been used to examine the role of personality and emotions in daily creativity (Conner & Silvia, 2015; Karwowski, Lebuda, Szumski, & Firkowska-Mankiewicz, 2017), relationships between creative activity, affect and daily flourishing (Conner, DeYoung, & Silvia, 2016), as well as links between day-to-day changes in creative activity and selfying (Karwowski & Brzeski, 2017). Moreover, there are several diary studies investigating daily creativity in an organizational or work context (e.g., Demerouti, Bakker, Sonnentag, & Fullagar, 2012; Gevers & Demerouti, 2013). Researchers tested the relations between leader daily opening and closing behaviors with employees' daily self-reported innovative performance (Wilden & Zacher, 2014), or relations between daily affective states and job conditions with daily creativity (Binnewies & Wörnlein, 2011). As such, we can see that, surprisingly, potential of diary method is not fully and extensively used in creativity research. Similarly, *experience sampling method* (ESM; Larson & Csikszentmihalyi, 1983) has been successfully, yet uncommonly used for better understanding variable nature of creativity in everyday context. ESM has been primary designed for the daily life activities and the flow experience examination (i.e., Csikszentmihalyi, Larson, & Prescott, 1977). Recently, researchers use this intensive and repeated measuring method for investigating people's emotional qualities of situations involving creative

activities (Silvia et al., 2014) or exploring the impact of new digital media on the flow and everyday experience (Gruner, 2016). However, intensive longitudinal methods are relatively seldom used for studying the multifaceted phenomenon of creativity. Specifically, when we attempt to understand the social nature of creativity, diary method seems to be helpful and promising. Thus, investigations rooted more in the We-paradigm (Glăveanu, 2010) may benefit not only by capturing the dynamic and contextual facets of creativity, but also by examining, for instance, whether presence of others, social interactions, or cultural influences predict our daily creativity.

Different Types of Research Questions Determine Different Diary Designs

Conducting diary studies is indeed challenging but also rewarding, i.e., it takes more time and effort than cross-sectional studies. However, using diary designs researchers collect data which might be analyzed in different ways to answer different research questions, mainly related to variable and contextual aspects of measuring creativity. Thus, before designing research using the dairy method, the key point is to identify what kind of information we can collect. In the literature three are well-described categories of research goals which might be obtained with dairy methods (i.e., Bolger et al., 2003). Diary designs (1) provide reliable, however generalized person-level data, (2) estimates of both within-person changes over time and individual differences in investigating changes, and (3) allow for the analysis of within-person changes and individual differences in these changes. In parallel to these goals, three types of questions can be answered: (1) questions linked to aggregated data, (2) questions linked to modeling the time course of the processes, (3) questions linked to modeling within-person processes. The following part of this section will focus on describing each category of research questions regarding studying creativity.

First, we might collect data indicating *what is the person like, and how much people vary from each other* (between-person differences and between-person differences in variability). In this case, data are aggregating over time,[2] thus we obtain an average experience of individuals (i.e., number and types of creative activities) by calculating means and variance over multiple observations (for example, instead of measuring creativity at a single point of time, we can use

[2] Researchers draw attention on the frequency and duration of assessments. These two aspects determine types of assessment schedule and should be chosen appropriately for the variable of interest.

a diary method to assess self-rated creativity over days, e.g., Conner & Silvia, 2015, or weeks). In the next step, by aggregating data from the daily creativity ratings, we obtain a person's average level of self-rated creativity. Researchers argued that this approach minimize the retrospection bias and estimation problems (Schwarz, 2012), as well as other situation-specific influences (Reis & Gable, 2000), which result in the reduction of systematic and random sources of measurement error and, consequently, increased validity and reliability. Aggregated responses allow us to descriptive analysis of day-to-day variability, thus answering how much people vary over time in variables of interest, which seems to be particularly useful for trait-like variables (Bolger et al. 2003) (Fig. 5.2).

The second category is focused on investigating the *temporal patterns and dynamics* of the constructs under study. Thus, attention is drawn on the time course of processes in two basic aspects: characteristics of the time course for the typical person (within-person variability) and individual differences in change over time (between-person level; see Fig. 5.3). In other words, using diary designs we are able to analyze individual's changes in experiences, activities, or self-perception mechanisms and differences in changes over time. For example, recent findings demonstrate daily fluctuations in entrepreneurs'

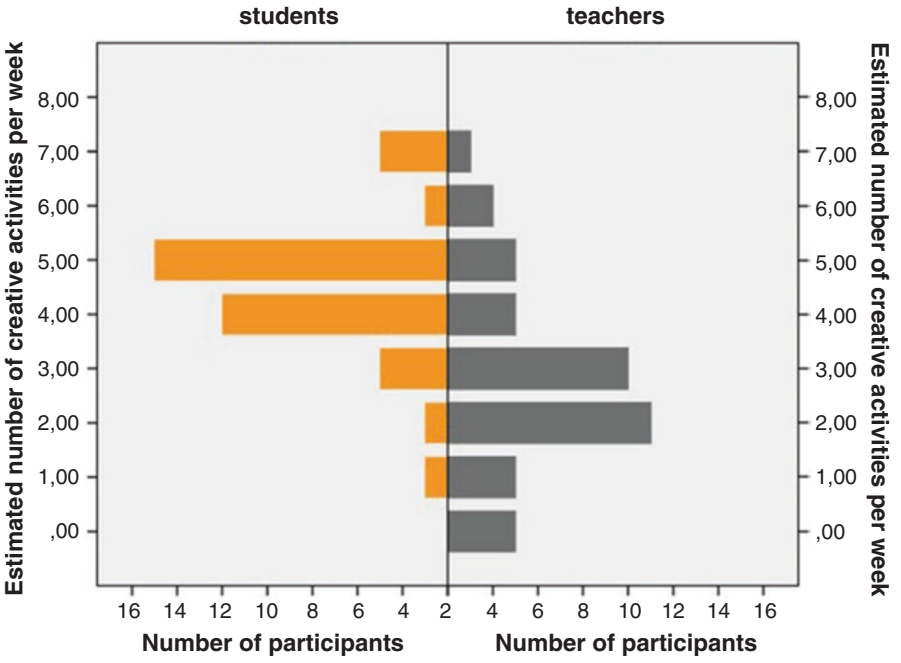

Fig. 5.2 Hypothetical aggregated data of teachers and students

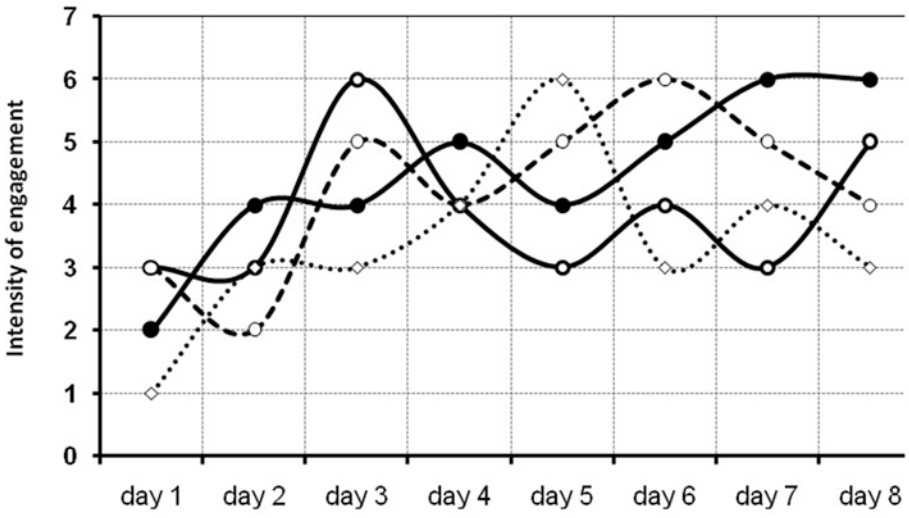

Fig. 5.3 Fictitious data of four participants of diary study who participated in a creativity training program

creativity across 12 consecutive days (Weinberger, Wach, Stephan, & Wegge, 2018) and consistent fluctuations in levels of task absorption and individual creativity at work over four weeks (Gevers & Demerouti, 2013).

The third category of research questions that can be studied using diary designs is related to the *processes underlying within-person variability*. In this case, dairy methods are particularly useful to identify factors affecting changes in temporal experiences, examine their antecedents, predictors, correlates, as well as outcomes. Furthermore, researchers can also assess whether and how people differ in these processes, and identify the sources of these differences (see Fig. 5.4). Diary studies of within-person processes are nonexperimental; however, the ability to capture within-person variation (Binnewies & Sonnentag, 2013) has been noted as one of the most important advantages of the diary method.

Diaries data are commonly analyzed with multilevel models (see Nezlek, 2012) and latent growth curves (Gross, Meier, & Semmer, 2013). For the purpose of this chapter, it's worth noticing that collecting data for several consecutive days results in several levels of nesting. For example, a typical two-level dataset includes responses nested within days (Level 1 – days) and days nested within participants (Level 2 – participants). Before conducting the main analyses, researchers started with empty (baseline) multilevel models to estimate the percentage of variability (i.e., Karwowski et al., 2017). Moreover, within-person analyses of repeated measures data allow inferences about the temporal sequence of processes, using time-lagged analyses (i.e., Conner et al.,

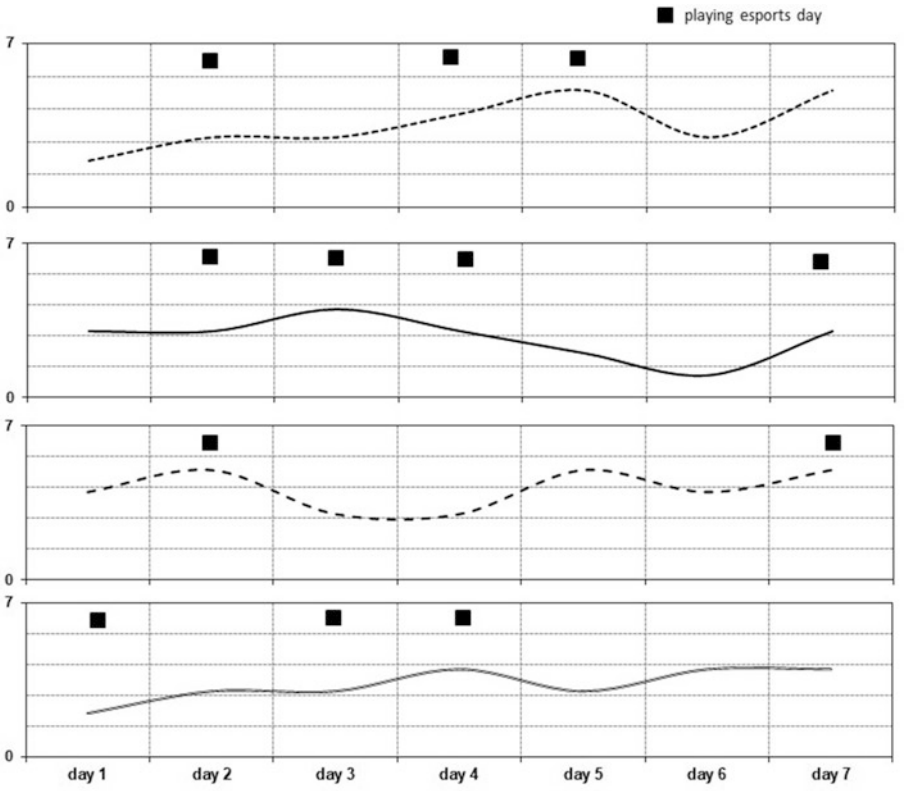

Fig. 5.4 Fictitious data of four participants demonstrating day-to-day changes in self-reported creativity

2016). A recent study demonstrated carry-over effects, thus the fact that everyday creative activity leads to increased well-being. Additionally, using the diary method we can analyze the daily or week covariation of different constructs. For example, the weekend covariate was controlled for weekday versus weekend differences in affect and creativity (Conner & Silvia, 2015). In this approach, day-level (Level 1) data are centered around the grand mean (i.e., grand-mean centering). Therefore, this analytical strategy takes both within- and between-variation into account. As day-level data capture both within- and between-person variance, it is important to control for between-person variables; otherwise, the covariation of day-level constructs may be inflated by between-person differences.

Well-designed diary studies can be used for answering a wide range of questions, disentangling within- as well as between-person processes and their interplay. However, the key issue is for the research question and the design to correspond (Bolger et al., 2003). Thus, before conducting diary designs, it's

worth considering some methodological issues. In the literature there are numbers of concrete recommendations, and some relevant suggestions are presented as follows.

Methodological Issues in Designing Diary Study

Investigators planning intensive longitudinal designs will be faced with several decisions concerning methodological as well as technical issues when conducting their study. First, researchers can have a dilemma of which type of the diary design will be appropriate for the constructs under investigation. The decisions about implemented protocols, time, duration and frequency of assessment depend on the nature (e.g., discrete vs. continuous), pace of change (slower vs. faster moving), and the variability (high vs. low) of the phenomenon under investigation. The four-way classification of daily event recording protocols (interval-, signal-, event-, and device-contingent design) is related to the research questions but also to methodological issues and technological solutions. A broader category of protocols named *time-based designs* (Bolger et al., 2003) include interval- and signal-contingent designs, allowing researchers to study within-person processes and ongoing experiences. However, if investigators are interested in studying rare events, then they should consider *event-contingent designs*. Finally, using mobile sensors, researchers can design *device-contingent protocols* which allow for simultaneously data collection from various modalities and sources. Moreover, designed momentary assessment is more focused on and directed towards specific types of experience-in-context information (Bolger & Laurenceau, 2013). Table 5.1 summarizes descriptions and the main characteristics of each diary design.

However, despite the dilemmas concern appropriate diary design choices, there are a number of other issues to consider. For instance, researchers should keep in mind that the frequency of assessment is not random or accidental. Some variables are simply better suited to a once-a-day assessment approach and this depends on their variability; those that have low variability are measured less densely and frequently (Bolger & Laurenceau, 2013). Although the optimal time of assessment should be evoked by theory, predicting temporal patterns of relationships between variables or their trajectories over time, social science models rarely specify them. Collins (2006) suggest that frequent assessments over small units of time are suitable when there is limited theory or past work to go on. On the other hand, when investigating processes that are less dynamic than predicted, according to the theoretical framework, we can already aggregate data before conducting the analyses.

Table 5.1 Characteristics of diary designs

Type of design	Characteristics	Advantages	Disadvantages
Time-based design	*Interval-contingent design*; *fixed-interval schedule* Participants recorded their experiences at regular, predetermined, and equidistant intervals. Studying constructs are assessed one or two times at the same time each day.	Less intrusive Suitable for experiences of interest that can be easily remembered	Involve more retrospection – retrospective biases may occur
	Signal-contingent design; variable-interval schedule Participants self-reported their experience when prompted to do so at different time. The researcher determines if the signal is fixed, random or blended.	Typically no retrospection	Rather intrusive
Event-contingent design	Participants answered each time the event described in the questions occur. Researchers concretely define the event that participants are to report on so that they can do so infallibly.	Allow for assessment of rare and specific events or episodes	Rely on the participants detecting an event, thus may be disruptive
Device-contingent design	Sensors (i.e., Bluetooth, GPS place tracking, etc.) are implemented in the smart phone for detecting specific events or situations and collecting parallel information (such as heart-rate or location)	Researchers can continuously monitor various data (psychological, physiological, performance, spatial, environmental), even with little to no awareness on the part of the participants Reduce participants' burden	High cost of conducting diary study with this type of design

Researchers interested in conducting diary studies should also pay attention to issues related with measurement reliability. Typically, scales dedicated to retrospective or trait-level assessment have been reduced and adapted for capturing everyday experience. Table 5.2, for instance, presents selected examples of creativity studies with the measurements they use. As Mehl and Conner (2012) noticed, the stability of scales over time is one of the biggest challenges for future directions in developing diary methods.

The success of conducting diary studies which provide precise, reliable data strongly depends on the participants' commitment and dedication (Bolger et al., 2003). Intensive longitudinal designs tend to be time-consuming, and mostly burdensome; for instance, diary study may involve interruptions at inappropriate times. Researchers should be aware that too much responses burden participants and can boost random (bored) responding, forgetfulness or noncompliance. On the other hand, there is a risk of reactance effect, habituation, or increased complexity. As a consequence, we might obtain missing or invalid data and attrition. Thus, it's worth considering some factors such as optimal length of assessment, reminders and electronic data collection which may increase the compliance rate. Overall, a majority of daily diary studies range from 7 to 30 days and, according to experts, should take under 10 minutes per day in order to minimize the burdensome and intrusive potential of diaries (Mehl & Conner, 2012). In addition, compliance rates might be better than ecological momentary assessment, when participants respond once per day, compared to assessments that occur multiple times. Next, a simple method to significantly increase likelihood of compliance is to use reminders, for example e-mail, with an active link to the diary study (Mehl & Conner, 2012). In the daily diary literature, there have been wide discussions about the benefits and limitations of electronic (mobile, web survey or handled) formats (for detailed characteristics and comparisons see Bolger et al., 2003; Bolger & Laurenceau, 2013; Mehl & Conner, 2012). Generally, available diary programs (i.e., Diario; Expimetrics; LifeData; PACO; PsychData; PsyMate; Qualtrics; Survey Monkey; SurveySignal) offer a number of advantages (i.e., signaling, time-stamping), and useful features (i.e., randomizing items, display various response formats), which increase accuracy and ecological validity.

Summary

The aims of this chapter was to provide several methodological arguments for the potential of longitudinal intensive designs, particularly the diary method, to help us capture creativity in naturalistic contexts. For instance, field inves-

Table 5.2 Examples of creativity studies using daily diary method

Authors	Daily diary measures	Measurements
Binnewies and Wörnlein (2011)	Creativity	8-items from the adapted scale of Tierney, Farmer, and Graen (1999). Sample items: "Today, I tried out new ideas and approached to problems." "Today, I generated novel, but operable work-related ideas."
	Quantitative creativity rating	Participants were asked to write down the most creative idea they had During the day
	Positive and negative affect	PANAS scale
	Daily time pressure	Scale developed by Semmer (1984) Sample item: "Today, I was required to work fast at my work."
	Daily level of situational constraints	Scale developed by Zapf (1993) Sample item: "Today, I had to work with materials and information that were incomplete and out-dated."
Conner and Silvia (2015)	Creativity	"Overall, how creative were you today? Creativity includes coming up with novel or original ideas; expressing oneself in an original and useful way; or spending time doing artistic activities (art, music, painting, writing, etc.)."
	Emotions	Participants rated 18 presented emotions for how they 'felt today'
Conner et al. (2016)	Creativity Emotions	Identical questions as in Conner and Silvia's study (2015)
	Flourishing	8-item adapted flourishing scale Sample items: "Today, I led a purposeful and meaningful life" "Today, I was engaged and interested in my daily activities." "Today, my social relationships were supportive and rewarding."
Karwowski et al. (2017)	Creative activity	"During the whole day, did you do anything that required creativity/imagination/ingenuity?" Intensity of engagement in 15 different activities
	Emotions	Participants assessed how strongly they felt each of the 18 presented emotions

(*continued*)

Table 5.2 (continued)

Authors	Daily diary measures	Measurements
Karwowski and Brzeski (2017)	Creative activity	Intensity of engagement in 15 different activities
	Selfying	Intensity of selfie posting
Weinberger et al. (2018)	Daily creativity	Assessed in the evening telephone interviews. Participants rated their own idea generation during the working hours of the present day, using 3-items scale by Janssen (2000) Sample items: "Today, during my work, I have created new ideas for difficult issues." "Today, during my work, I have searched out new working methods, techniques, or instruments." "Today, during my work, I have generated original solutions for problems."
Wilden and Zacher (2014)	Employee daily self-reported innovative performance	4-items scale by Welbourne, Johnson, & Erez (1998) Participants were presented with the following statement: "Considering all of your job duties and responsibilities, how would your supervisor or boss rate your behaviour at work today?" Sample items: "Creating better processes and routines" "Working to implement new ideas"
	Daily ambidextrous leadership	Two scales adapted from Rosing et al. (2011) and Zacher and Rosing (2015) Sample items: "Today, my supervisor encouraged experimentation with different ideas." "Today, my supervisor paid attention to uniform task accomplishment."

tigations of creativity using daily diary may test whether people's perception of creativity or motivation to creative work is stable or rather variable across a typical day or week, and evaluate individual differences in the observed pattern. Moreover, daily diary methods can be adapted to examine the dynamic nature of self-regulation in the creative process (Ivcevic & Nusbaum, 2017) or to explore role of more specific strategies of self-regulated learning for creative performance (Rubenstein, Callan, & Ridgley, 2018). In addition, researchers suggest that dynamic, real-time measures and micro-longitudinal designs allow for more valid and accurate investigation of people's regulatory beliefs, thus promoting creative metacognition (CMC; Beghetto &

Karwowski, 2017). In this case, it seems interesting to explore, for example, whether and how two aspects of CMC: (1) *accuracy* of performance appraisals and (2) *regulation* of behavior, change over time and under various features of the context. Indeed, for a better understanding creativity as a social phenomenon and for answering questions about the dynamic and changeable nature of people's behaviors and interactions, more studies need to be conducted outside the lab, in a natural yet uncontrolled environment. Diary methods have a robust potential to capture everyday creativity with ecological validity and to identify social factors related with those days when people are creative.

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6

Imaginative Play, Socio-emotional Competence, and Sociometric Status in Preschool Children: Common Methodological Problems and New Research Directions

Dorota Maria Jankowska and Iwona Omelańczuk

Introduction

The study of play can be looked at from different perspectives, such as developmental, psychoanalytical, behavioral, environmental, cultural, anthropological, and phenomenological (see Stagnitti, 2004, p. 4; Wallace & Russ, 2015, pp. 29–43). In this chapter, children's play will be analyzed using a development-based perspective (Yawkey & Pellegrini, 2018). Among many types of play in which children engage (e.g., manipulative, construction, physical, games-with-rules), we focused on imaginative play, defined as play that includes pretending, the use of fantasy and make-believe, and the use of symbolism (Russ, 2004).

Does imaginative play have meaningful functions in children's social development, including for functioning within the peer group? If so, how do children increase their social competence and emotional maturity during imaginative play? Why does play provide an opportunity to practice social skills? What pieces of evidence support these claims? Two theoretical, methodological problems this chapter concerns itself with are the following: (1) the relations between imaginative play and social competence in the pre-school

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period, and (2) the mediation of social competence between imaginative play and sociometric status in the peer group.

The main thesis of this chapter is that imaginative play is an effective, spontaneous way to develop socio-emotional competences in childhood. Furthermore, it is believed that creative children with vivid imagination may be judged more favorably by peers as they often have original ideas in play and thereby earn respect among peers. Thus, in this chapter we firstly define imaginative play, components of social competence and peer status, and briefly review the research literature on the possible relations between these concepts. Next, we describe the significance of the peer group for social functioning and review the evidence that supports the claim that imaginative play is a natural way of supporting the child's social development. Furthermore, we discuss common methodological challenges in assessing children's social competence, sociometric status, and imaginative play. Finally, we present the proposal of new research in this subject area.

Imaginative Play, Socio-emotional Competence, and Peer Status

Imaginative play (also called *pretend play* or *make-believe play*) is a complex behavior which involves pretending, the use of fantasy, make-believe, and symbolism (Russ, 2004). There are many different forms of imaginative play, and developmentally children need time to explore each of them. These activities generally begin to appear in early childhood, when children start understanding the idea of pretense (Bosco, Friedman, & Leslie, 2006). The basic forms of pretending in play include: (1) object substitutions, which consist of accepting that the object is something that is actually not there, e.g., a banana as a phone, (2) attributions of properties that is, treating objects as if they had qualities they do not have, e.g., wet clothing, when in reality it is dry, and (c) nonexistence or imaginary objects, which consists of imagining something that in reality does not exist, e.g., an imaginary sword in your hand (Leslie, 1987). Role play with other children (*socio-dramatic play, social pretend play*) usually appears between the age of 3 and 5, and it is the so-called *high season of imaginative play* (Singer & Singer, 1990, pp. 64). This type of play has an interactive nature, i.e., children start to pretend with other children taking on different roles during this act. During play, they use more language and nonverbal communication (e.g., gestures, facial expression) to plan a play and talk about it, as well as later, during the play. At the beginning, the play is rather of a reproductive nature but it can gradually be replaced with more creative

forms of play where children create their own imaginary worlds (*imaginary private worlds, fantasy worlds, paracosms;* Root-Bernstein, 2014). Children's play is enriched by the creative products of their imagination. This advanced symbolic play is based on highly imaginary themes – things which do not really exist or events children have seen or heard about but did not experience personally, such as being superheroes (Weitzman & Greenberg, 2002). According to Vygotsky (1976, p. 552), "action in the imaginative sphere, in an imaginary situation, the creation of voluntary intentions and the formation of real-life plans and volitional motives – all appear in play and make it the highest level of pre-school development".

Social competence is understood as a condition of possessing social, emotional and intellectual skills and behaviors necessary to succeed as a member of society. It can be defined as a set of constantly developing skills which contribute to effective interactions with the environment and determine peer acceptance. Social competence might be analysed on many levels (theoretical, index, skills level) and there is a multitude of conceptualizations for them. On the skill level, social competence is associated with: (1) perspective taking (the ability to recognize internal states and their causes), (2) communication (e.g., about mental state), (3) empathy (4) affect and behavior regulation, and (5) social problem solving (Rubin, Bukowski, & Parker, 1998). Thus, social competence is linked with emotional competence because handling one's own and other people's emotions is crucial in the initiation and maintenance of social relations. There is a number of factors related to social competence which refer to functioning in a peer group. The most significant aspects of the peer social status are: (1) reading, interpretation and proper reaction to other people's emotions, (2) prosocial behaviors, connected with the ability to share, (3) antisocial behaviors, mainly aggression, and (4) the ability to solve interpersonal problems (Newcomb, Bukowski, & Pattee, 1993).

There is a lot of evidence pointing to a relationship between play (including imaginative play) and social competence (see Creasey, Jarvis, & Berk, 1998). This does not seem surprising because during social play you need to be able to get in touch with peers, interpret signals they send and respond to them, as well as avoid aggressive and destructive behaviors (Bierman & Welsh, 2000). In the context of social competence, imaginative play has an advantage over other types of plays because children's interaction last long and, as a rule, more participants are involved who must cooperate and compromise (Connolly, Doyle, & Reznick, 1988). However, empirically proven connections between those variables are not so obvious. On one hand, we have children who engage in imaginative play more often, whose social competence are higher and who are rated as more prosocial, gregarious, having less difficulty with peers and

are more liked (Colwell & Lindsey, 2005). These dependencies are not affected by the thematic variety of play undertaken and the roles children play in them (Youngblade & Dunn, 1995). On the other hand, more frequent participation in imaginative play is connected with a greater number of behaviors in the form of instrumental aggression (Howes & Matheson, 1992). It has also been proven that this relationship moderates the impact of the sex of the companion in a play episode. Boys who often engage in imaginative play with a same-sex peer are more liked but acceptance in a group might fall if their companion in the imaginative play is a girl. When it comes to the girls, peer acceptance increases with more frequent involvement in imaginative play regardless of the gender of their play companions (Colwell & Lindsey, 2005).

The ability to deduce other people's mental states is one of the most intuitive and most often analyzed social skills, possibly relating to all the forms of imaginative play (e.g., object substitutions, attributions of properties, nonexistence or imaginary objects) (see Lillard, 1993). There is evidence that, with increasing involvement in imaginative play, children's ability to infer about mental states of other people also increases (Youngblade & Dunn, 1995), although researchers also claim a lack of such dependencies (e.g., Swindells & Stagnitti, 2006). Studies conducted on the relationship between pretense and theory of mind (ToM) show that pretend play abilities do relate to ToM skills, specifically regarding symbolic use in pretend play and false belief tasks in ToM (e.g. Lillard, 1993; Lillard & Kavanaugh, 2014; Nielsen & Dissanayake, 2000). Results of the study carried out by Lillard and Kavanaugh (2014) showed that imaginative play at 2.5 years, the ability to complete a play narrative at 3 years, and role-playing at 4 years related highly to ToM at ages 4 and 5. Nielsen and Dissanayake (2000) found that object substitution and role assignment ability during pretend play related to false belief performance. Children who performed more object substitutions in play and were able to assign various roles to characters scored better on ToM tasks. These findings support the idea that imaginative play can be a natural way for ToM to develop.

During imaginative play, children talk more about other people's states of mind and their own mental activity than in other plays. It has also been proven that pre-school children with greater ability to infer about internal states of other people are more cooperative and less confrontational during imaginative play. They discuss a joint pretend, plan or game, take a pretend role as part of a joint pretend narrative, or follow a pretend suggestion of the other child and are less prohibiting another's action through disagreement, protest, threat, insult or refusal of a request. Children with greater abilities in the area of ToM during imaginative play are less likely to make failed 'bids' for

communication with their peers or to be unresponsive (Dunn & Cutting, 2001).

Not all studies, however, confirm that more frequent involvement in imaginative play is connected with greater ability to infer about states of mind of other people (Astington & Jenkins, 1995). Some researchers argue that more frequent imaginative play is associated with a greater ability to read internal states of others, but only in the case of children with high ability to imaginative play, not in children with average or lower ability (Swindells & Stagnitti, 2006). The lack of a direct relationship between ToM and imaginative play does not exclude indirect relationships. Children with greater ability to infer about the minds of other people often assign a pretend role to themselves or to another child and are more likely to make joint proposals in their imaginative play (Astington & Jenkins, 1995). It is possible, then, that although ToM is not directly related to imaginative play, there are links between the theory of mind and the behaviors that constitute the components of imaginative play.

The relationship of such social competence as the ability to recognize other people's emotions and the reasons for their emergence from imaginative play is also interesting. With regard to some findings, we can speak of a positive relationship between these characteristics in pre-school children (Lindsey & Colwell, 2013), but there are also analyzes that do not confirm this relationship (Taylor, Carlson, Maring, Gerow, & Charley, 2004). Emotional understanding is, however, connected with the quality of imagination during imaginative play (Seja & Russ, 1999). With increasing involvement in imaginative play, positive emotional expressiveness also grows, and negative emotional expressiveness decreases (Lindsey & Colwell, 2013). What is more, children who engage more often in imaginative play, and have imaginative play of higher quality, better regulate their stimulation of emotions (Galyer & Evans, 2001).

Researchers have examined a number of factors which are related to peer acceptance and social and emotional competences during the kindergarten period (e.g. Denham, McKinley, Couchoud, & Holt, 1990; Mostow, Izard, Fine, & Trentacosta, 2002). However, very little research has been conducted to address the relation between peer status and creativity among young children (Gebart-Eaglemont & Foddy, 1994; Lau & Li, 1996; Northway, Rooks, & Moreno, 1955; Yamamoto, Lembright, & Corrigan, 1966). Lau and Li (1996), based on the teachers' ratings and the peer nominations, have examined the relationship between peer status and creativity in grade 5 Chinese students in Hong Kong. This research indicated that the most popular children had the highest level of creativity. The neglected children had very low creativity scores, as did the rejected group. These findings, however, do contradict

previous research in this area (e.g., Gebart-Eaglemont & Foddy, 1994; Yamamoto, 1964). The reason for this discrepancy can be explained by the classification method of children's peer status, sample size, and measurement of creativity. The methods of measurement employed in the early research had no solid theoretical framework, e.g., projective measures of creativity used by Gebart-Eaglemont and Foddy (1994). In one of the studies (Yamamoto et al., 1966) intelligence was included in the measurement. These findings suggest that more creative and more intelligent children tend to be more often nominated as friends and less often as nonfriends than their less creative or intelligent peers, but the obtained effect was low. Moreover, the correlation between the number of received nominations and creative thinking was larger than that between nominations and intelligence.

In summary, although not all research results confirm that there is a relationship between social competence and imaginative play, one can find support for the statement that the development of this competence seems to involve imaginative play. This is because, during imaginative play, children have the opportunity to test behavior in a safe environment related to social norms and principles, and to study their partner's response to their actions. Engaging in imaginative play also enables the regulation of emotions, for example, through symbolic recreation, the practice of determining and negotiating conventions with the partner, the rules of play, or the roles played in it. Interestingly, the relationship between imaginative play and sociometric status has not yet been explored. Nevertheless, the latest research on the creativity of young children and sociometric status suggests that popularity and creativity (maybe also creative imagination) are related.

Research of Imaginative Play and Functioning in a Peer Group: Methodological Challenges

Lillard et al. (2013) point to a number of problems connected with the literature concerning the on pretense as a factor of development. These include, among others, correlational studies discussed as causal, failure to replicate, experimenter bias, nonrandom assignment, differing control and experimental conditions, confounding of content with pretense, and unsound statistical practices. Given these limitations, what could or should be the next step in the area of new research about imaginative play, children's creativity for socio-emotional competence? Most of the present research evidence regarding the relationship between imaginative play and social competence has come from small-scale studies, as in the case of studies concerning the link between

imaginative play and children's creativity. Moreover, these samples were often made up mainly of female or students recruited from a single educational institution (e.g., Wallace & Russ, 2015). These situations restrict the generalizability of the findings. Therefore, we propose that future analysis include both imagination (imaginative play) and creative thinking as various aspects of children's cognitive creativity. On this basis, it will be possible to evaluate the content validity of measures of imaginative play (in relation to theoretical and empirical descriptions of the creative process) and criterion validity (in relation to measures of creative potential, e.g., divergent thinking), which has recently been undermined (Lillard et al., 2013). Furthermore, when considering the different aspects of creativity on much larger samples than before, we would have a chance to prove robust relationships between these variables and enable the application of robust statistical procedures such as structural equation modeling. The magnitude of effects for current findings is relatively low, and this seems to be a function of the sample size. Moreover, if this research was longitudinal, it would be possible to compare the dynamics of changes in the development of imaginative play and creative abilities, for example, creative thinking. What is more, based on such research, it would be possible to determine whether there are critical periods when benefits of play are less evident. But it will be a huge challenge because most of the tools for measuring the fun imaginary character is examined individually (e.g., *The Affect in Play Scale*; Russ, 2004), which is time-consuming, similar to longitudinal studies.

Another common problem in discussions of the relationship between imaginative play on social development is that authors often discuss correlational findings as if they were causal. Meanwhile, the studied link between imaginative play and social competence so far was primarily correlational in nature (Lillard et al., 2013). In future research it is worth investigating specific mechanisms that account for the relationship between imaginative play and social competence in peer interactions, similar to existing comparisons between pretend play and creativity (see Wallace & Russ, 2015, pp. 24–28). For this purpose, we can use *The Affect in Play Scale* (APS; Russ, 2004). This is one of a few standardized methods of rating imaginative (pretend) play processes for children 6 to 10 years of age using an observation of a standardized play task. Children are given two human puppets, with neutral (boy and girl) appearance, and three small blocks, and are instructed to play any way they like for 5 minutes: "I'm here to learn about how children play. I have two puppets and I would like you to play with them any way you like for 5 minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud.

The video camera will be on so that I can remember what you say and do. I'll tell you when to stop." The child is told when 1 minute is left with the instruction: "You have 1 minute left." (Russ, 2014, p. 177). But, more importantly, the structure of the APS reflects the separate cognitive and affective processes present in imaginative play. Factor analytic studies of the APS have confirmed these two factors (e.g. Russ, 1993). The cognitive factor encompasses the quality of fantasy and comfort in play. The quality of fantasy rating is the mean of the following three dimensions: (1) imagination (1–5 global rating) – this score measures the novelty of the play, the ability to pretend, e.g. the ability to transform the blocks and pretend with them, and use fantasy, (2) organization (1–5 global rating): this score measures the organization of the play, and considers the quality of the plot and complexity of the story, and (3) elaboration (1–5 global rating) – this scale measures the amount of embellishment in the play. The comfort in play score also is rated on a 1–5 scale and includes the involvement of the child in play and his/her enjoyment of the play (Table 6.1).

The affective factor of the APA includes three major affect scores: (1) frequency of affective expression, (2) variety of affective categories, and (3) the mean of the intensity of affect. The frequency of affect score measures the total number of units of affect expressed by an individual puppet in the 5-minute period. A unit can be the expression of affect state, an affect theme or a combination of the two. The variety of affect score is the number of different categories of affect, which can be expressed in play. There are 11 possible affect

Table 6.1 Model of APS imagination scale

Scale	Made-up and pretended elements	Transformations	Changes and twists
1	Lack of new made-up elements in play	Lack of transformations in play	There are no twists
2	Few new elements in play	One or two easy transformations in play	There are no twists
3	Play is quite differentiated, with new elements, not closely related to child's experience	Three and more transformations in play	There are some simple changes and twists
4	Play involves a lot of various elements, some of which are made-up	There are a lot of transformations in play	There are twists, some of which are unusual
5	Play involves a lot of original, made-up elements which are not related to the child's experience	There are a lot of complex transformations in play	There are frequent and surprising twists

Source: Own study based on Russ (2004)

categories in APS which can be classified as positive affect (happiness, nurturance, competition, oral, sexual) or negative affect (anxiety, sadness, aggression, frustration, oral aggression, anal). The mean of the intensity of affective expression measures the intensity of the feeling state or content theme. Each unit of affect is rated for intensity on a 1–5 scale. Finally, we can use the affect integration score, which taps how well the affect is integrated and controlled by cognitive processes. This scoring is obtained by multiplying the quality of fantasy score by the frequency of affect score (Russ, 2014).

There is a promising brief rating version of the APS, which does not require videotaping (*Affect in Play Scale–Brief Rating Version*; APS-BR; Cordiano, Russ, & Short, 2008). The major difference between the original APS and the APS–BR concerns the way in which the frequency of affect expression is assessed. On the original APS, the rater scores the total frequency of units of affective expression and, on this basis, classifies the content of the affect according to 11 possible categories. On the APS–BR, the rater assesses the total frequency on a scale ranging from 1 (low) to 4 (high) affect expression. Moreover, rating the quality of fantasy and comfort of the play is modified. Furthermore, just as in the case of assessment of affective processes, also in these scales, the 4-point Likert scale has been adopted to simplify the scoring.

Turning to assessing social competence, it is to be noted that the variety of conceptualizations of this variable entails a multitude of ways to measure it. There are three basic groups of tools used to measure social competence: (1) behavior rating scales, (2) direct behavioral observations, and (3) experimental tasks (Krasnor, 1997). Behavior rating scales consist of a series of questions regarding the social competence of the child addressed to parents or teachers. The tools of this type with good psychometric properties include, among others, the Social Skills Rating System (SSRS; Gresham & Elliott, 1990). Their greatest advantages include ease of administration, low cost of research and low data collection time. However, even if a tool has stronger psychometric properties, it is exposed to the respondent's bias or difficulty in describing or assessing the phenomena. It also limits the chance of capturing the complexity of the phenomenon and detecting differences at the individual level (Halle & Darling-Churchill, 2016). Direct behavioral observations allow to describe the natural and general pattern of behavior and interaction of the child while engaging in various forms of free play or arranged tasks that take the form of social challenges in a group of known or unknown peers. Although conducting measurement by means of observation provides more complete information than behavioral scales, it requires a lot of knowledge, special training, mindfulness and objectivity of the observer, and very careful

planning of the observation procedure itself. In addition, during the observation conducted, there may be no behaviors that are in the set of a person's behavior, which will limit the possibility of drawing conclusions about specific phenomena (Jones, Zaslow, Darling-Churchill, & Halle, 2016). Schemes as well as observation coding systems are most often designed individually for each study, although there are also quite universal schemes such as the *Facial Action Coding System* (FACS; Ekman, Friesen, & Hager, 2002).

In turn, in experimental tasks, children are confronted with a specific problem, to be solved by a detailed, usually well-defined social skill. The most commonly used is a group of tasks related to ToM (see Byom & Mutlu, 2013), for example, *Reading the mind in the eyes task* (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). In this task, children are required to read mental and emotional states based on the expression of the eyes presented in the photographs. *Fals belief tasks* are also often used and their goal is to determine knowledge, beliefs, expectations and predict behaviors which result from them (Wimmer & Perner, 1983). Experimental tasks are connected with social competence, and above all with various theoretical mind apexes, and they constitute a group of effective tools in measurements. Regardless, they also have some limitations. In a natural, dynamic, complex and unstructured situation in which there is social and emotional engagement, there might be other motivational processes than in the evoked, static and fragmented laboratory situation, which takes the form of a clearly defined problem to be solved. Such a method allows one to get to know the child's behavior potential, not its action in real situations (Schilbach et al., 2013). Nevertheless, it seems to be the most appropriate way to measure in future research on imaginative play and functioning in a peer group of preschool children. When examining the effects of moderation of social competence in the relation between imaginative play and social status in the peer group, one should focus on measuring those skills that in current correlation studies indicate significant dependencies and covariations.

One complex tool used to measure social competence which is based on experimental tasks and which allows a thorough analysis of social development, e.g., of preschool children is the Social-emotional competence subscale from the Intelligence and Development Scales (IDS; Grob, Meyer, & Hagmann-von Arx, 2013). IDS is a multi-dimensional assessment of general intelligence. Apart from that, however, it also enables the researcher to create developmental profiles of different spheres of children's behaviour including socioemotional competence, cognition, language, achievement motivation, mathematics and psychomotor skills. The score of social-emotional competence is the sum of scores obtained by a child in four dimensions: (1) Identifying

Emotions, (2) Regulating Emotions, (3) Understanding and explanation of social situations, and (4) Socially competent behaviour. The Identifying Emotions task involves recognizing and naming emotions of children in photos. The whole task comprises the identification of five emotions: happiness, anger, fear, grief, and surprise. Each emotion is presented in two photos – one by a girl and one by a boy. The Regulating Emotions task involves asking children questions related to three emotions (anger, grief and fear) presented in the photos from the Identifying Emotions task. The child is then supposed to describe different ways of dealing with each of these negative emotions The strategies of managing negative emotions could be put into the following categories: (1) 'adaptive strategies', when children make active attempts at changing negative emotions into positive ones, (2) 'other strategies', when children seek support and assistance of other people (e.g., they hug their moms) or they use different objects (e.g., they hit the pillow to release their anger) in order to change negative emotions into positive ones; (3) 'maladaptive strategies', i.e., lack of any attempts at changing negative emotions into positive ones (e.g., waiting till sadness disappears), or active attempts at changing emotions involving hurting yourself or people around you (e.g., scaring someone). The measurement, understanding and explanation of social situations consists of the two attempts in which a child is asked to describe a picture presenting five people (children and adults) and to explain what is going on in the picture. What is crucial in the evaluation of this task is: firstly, whether the child pays attention to the social context of the situation presented in the picture, and is able to interpret it well and, secondly, whether the child pays attention to emotions of particular people in the picture as well as the causes of those emotions. If the child has trouble with the task, the diagnostician can help him/her out by asking some follow-up questions. In the Socially Competent Behaviour task, the child is asked to name socially competent behaviour according to six social situations presented in the pictures: joining peer group at play, behaviour towards a child who is hurt or sad, dealing with being attacked by another child, observing other people in conflict, or in a situation when the property of a child has been destroyed by another child. Just as in the case of strategies involving regulating negative emotions, in the case of social strategies we can also distinguish (1) 'adaptive strategies' – typical of a socially competent child who is able to make active attempts at solving problems in social situations on his/ her own; (2) 'other strategies' – involving support and assistance of other people in an attempt to tackle social problems that a child might encounter; (3) 'maladaptive strategies', i.e., the lack of an active attempt at dealing with a difficult social situation, backing out or making attempts to solve a problem which are inadequate for a given situation.

Analyzing the relation between socio-emotional competence and creative potential in childhood it is worth taking into consideration the measurement of social functioning in the peer group. Newcomb et al. (1993) have analyzed the outcomes of the research concerning the social functioning of children of different sociometric status. The authors have proven that there is a big dependence between sociometric status and functioning within a peer group. Thus, it can be stated that social and emotional competence make it easier for children to establish and maintain satisfactory interpersonal relations. This, in turn, influences the quality of relations with peers (Rubin et al., 1998). In order to measure sociometric status we use sociometric methods, i.e., the class of methods that assess the positive or negative links between the people within a group, including functioning in a peer group. The most widely used method to measure sociometric status in childhood is peer nomination. It involves asking all members of the group identical questions related to different types of social relations on the basis of which they select the people that they would and would not like to interact with, e.g., play together. Researchers who want to use peer nominations to assess sociometric status in preschool period setting must make a few significant decisions about the administration of this method. One main decision concerns the questions used to solicit the sociometric nominations. In case of small children, the criteria must be selected in such a way that they are clearly defined, equally understood and significant for the children taking part in the research. Moreover, they should refer to present and they should be closely related to children's experience, e.g., playing together or inviting others to a birthday party. An unambiguous criterion of choice reduces the number of possible interpretations and as such increases the credibility of the obtained data. What is more, preschool children tend to demonstrate instability as to their likes and dislikes. That is why it is advisable to ask them to justify their choices. The second methodological decision concerns the use of unlimited or limited nominations. It has been proven that the unlimited nominations approach produces a more reliable assessment of sociometric status than limited nominations procedure (Terry, 2000). Moreover, in case of very small children such procedure is more justified due to the fact that self-control in the number of nominations is in their case limited. The last problematic issue concerns the procedure used to collect the nominations. In studies involving small children, the procedure based on recalling sociometric preferences does not prove to be accurate since children have problem with remembering all members of the group. Thus, in order to make it easier for children to make choices one might use a board with the pictures of all members of the group in question. The children also should be examined individually. Quantitative analysis of the outcomes obtained in a

sociometric study consists in calculating the indicators which might be divided into three groups: (1) individual indicators, describing the individual against the group, (2) indicators related to subgroups created in the analyzed group; and (3) group indicators, providing information about the features of a group ad a whole (Cillessen, 2009). The first two indicators might prove to be useful in the studies concerning the relation between imaginative play, components of social competence and peer status. The most commonly used methodology classifies children into one of five different sociometric status groups: (1) popular (liked by many, disliked by few), (2) rejected (disliked by many, liked by few), (3) neglected (neither liked nor disliked), (4) controversial (liked by some and disliked by others), and (5) average (around the means of acceptance and rejection). This categorization is based on two dimensions: (1) social preference which is created by analyzing the difference between the standardized acceptance and rejection scores, and (2) social impact, his or her visibility created by adding the standardized acceptance and rejection scores and standardizing the results (Coie, Dodge, & Coppotelli, 1982). In the same way that sociometric methods continue to be used, they also continue to evolve. For this reason, there are many variations of this basic procedure (see Cillessen, 2009; Cillessen & Mayeux, 2004).

Finally, new research is needed to verify single findings and, more importantly, examine the underlying mechanism which explains the moderating effect of gender. These studies also should provide a more natural context where children have a wide range of pretend activities in a play without unnecessary constraints, in order to achieve ecological validity and an understanding of possible gender differences. Natural settings allow spontaneous, pure play to occur, but also involve confounding variables such as toys available, the number of players, etc. Thus, we need more standardized measures of play, measures we can adapt to assess imaginative play in a natural context (Wallace & Russ, 2015). It would be almost ideal to use quasi-observations, describing behavior in an accurate and quantitative way, simultaneously synchronizing multiple data streams such as video, audio, eye tracking, physiology, and emotions (see The Observer XT).

Conclusion

In conclusion, we propose an initial research model of the relationship between imaginative play and functioning in a peer group that focuses on mechanisms and moderating factors, highlighting variations in developmental patterns for boys and girls. The issue of gender differences should not be

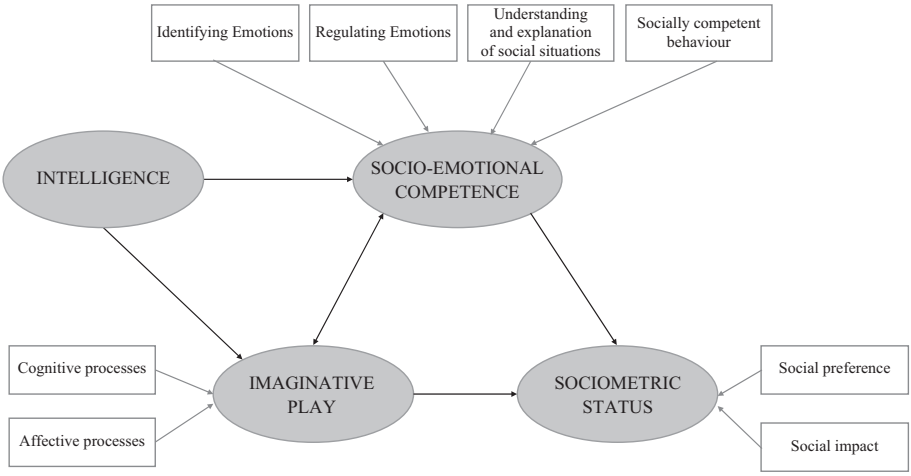

Fig. 6.1 The hypothetical model of the relationship between imaginative play and sociometric status

ignored because the process-related components of children's peer relations may vary between the genders (Fig. 6.1).

This model hypothesizes that children's cognitive creativity manifested in imaginative play is represented in fact by a set of processes that are linked to the social functioning of preschool children. Using this multilevel process-oriented approach, our focus on cognitive and affective processes in imaginative play (Wallace & Russ, 2015), that may help to elucidate the path of connection between children's creativity in play and peer group status. The validation of this conceptual framework seems to be important for the development of new research in this area, although the complexities inherent in such a model are numerous, particularly when considering moderators that have been identified in prior research, primarily socio-emotional competence and intelligence.

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7

Climate for Creativity: How to Measure It in Parent – Child Relationships?

Joanna Maria Kwaśniewska

Climate is a psychological term describing a group's perception about its own functioning (Ekvall, 1999; Hunter, Bedell, & Mumford, 2007; James, James, & Ashe, 1990; Parker et al., 2003). The group climate (Schultz & Schultz, 2016) is an expression of culture and can be perceived through the observation of a group and the way it functions. According to Rousseau (1988), climate refers to those aspects of the social environment which the group members are aware of.

The definitions of climate vary depending on setting. Organizational climate is defined as:

> the recurring patterns of behavior, attitudes, and feelings that characterize life in the organization. At the individual level of analysis, the concept is called psychological climate. At this level, the concept of climate refers to the individual perceptions of the patterns of behavior. When aggregated, the concept is called 'organizational climate' (Isaksen, Lauer, Ekvall, & Britz, 2000–2001, p. 172).

In a school setting, climate is described as the:

> quality and character of school life, (…) the heart and soul of the school (…) that essence of a school that leads a child, a teacher, and an administrator to love

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the school and to look forward to being there each school day (Freinerg, 1999, p. 11).

Academic climate is related to teaching and learning practices promoted in the school (Wang & Degol, 2016).

In general, climate in any sort of social group refers to the sum of individuals perceptions and interpretations of the recurring patterns of behavior, attitudes, and feelings that characterize life in that group. The perceptions of the climate take on personal meaning as well as motivational and emotional significance for people through a "valuation" process (James, Hater, Gent, & Bruni, 1978; James & James, 1989; James et al., 1990). In this process, a cognitive representation of the environmental features is interpreted in light of the personal value system and in terms of its significance for the individual's well being. Therefore, climate is a psychologically meaningful attribute rather than a set of concrete features characterizing the behaviors of certain social group, called culture. It is climate that mediates attitudinal and behavioural responses rather than the environment itself (James & Jones, 1974). Perceptions and valuations that constitute psychological climate vary because of personal differences, different situations experienced by individuals, and interaction between person and situation. According to Brown and Leigh (1996, p. 359) "perceptual biases and other individual factors may generate different perceptions of the same environment for different individuals."

Schneider (2002) established the term "climate for something" deeming that an individual's evaluation varies depending on the evaluation criterions which are used. Therefore, climate may be viewed from different perspectives and, based on the criterion chosen, one can speak of different sorts of climate. Such approach within the organizational context leads to identifying the climate for creativity (Amabile, 1983; Isaksen, Lauer, & Ekvall, 1999; Isaksen et al., 2000–2001; West & Farr, 1990) and many other, more specific climates such as a climate for service (Schneider, 2002; Schneider & Bowen, 1995) or climate for safety (Zohar, 1980).

Most of the research on climate is conducted in an organizational setting (Amabile, 1996; Isaksen et al., 1999; Isaksen et al., 2000–2001; Isaksen & Lauer, 2002; Kwaśniewska & Nęcka, 2004; Nęcka & Kwaśniewska, 2005; West & Farr, 1990) and school environment (Griffith, 1999; Schneider & Duran, 2010; Van Houte, 2005). It is possible to measure the climate for creativity within organizations due to such self-report questionnaires such as KEYS: Assessing the Climate for Creativity (Amabile, Burnside, & Gryskiewicz, 1995) and the Situational Outlook Questionnaire (Isaksen et al., 2000–2001). Similarly, information about school climate is collected

mainly with the use of surveys. Other methods such as interviews, focus groups, observational reports and ratings of school climate are used less often (Wang & Degol, 2016). In some cases, school climate is assessed indirectly through measures such as student attendance, suspensions, teacher turnover, or student mobility (McConnell, Priest, Davis, & McEvoy, 2002). Obtaining an accurate picture of the climate is an essential component for improving the environment in both business and at schools.

Although many studies have been conducted on the impact of early family relations on creativity, there are no existing tools to measure the specific climate for creativity in the relationship between a parent and a child.

Research on Climate for Creativity in a Family Context

According to Runco (2007), research on families is very complicated for at least three reasons. Firstly, it is necessary to collect much data about the family, such as: careers, values, education, divorces, birth order, number of siblings in the family, age gap, or interval among siblings, sex of the children, cultural background and socioeconomic situation of the family. As Runco (2007) puts it, "even this list leads to literally hundreds of combinations and family types. That makes it difficult to isolate a particular influence, and difficult to conduct sound research on the topic" (p. 53). What is more, some family processes are very private and therefore difficult to study. Finally, family influences are longitudinal, and therefore the effects of them can be determined only by longitudinal research.

Despite these difficulties, many studies on the impact of family factors have been conducted to date (e.g., Albert, 1971, 1980, 1994; Albert & Runco, 1986; Amabile, 1989, 1996; Bloom, 1985; Colangelo, 1988; Csikszentmihályi, 1996; Goertzel, Goertzel, & Goertzel, 1978; Harrington, Block, & Block, 1987; Helson, 1968; McCurdy, 1960; Michel & Dudek, 1991; Milgram & Hong, 1999; Miller, Lambert, & Neumeister, 2012; Runco & Albert, 2005; Walberg, 1981; Walberg et al., 1996). Some of them relate to the structure of the family (e.g., position in the family, the size of the family, number of siblings in the family), the others concern the processes taking place among family members (Runco, 2007). Climate for creativity applies to these ongoing processes in the family.

Climate for creativity in parent – child relationship is defined (Kwaśniewska, Gralewski, Witkowska, Kostrzewska, & Lebuda, 2018) as the parents' overall,

relatively constant, behavioral pattern that helps or makes it difficult for the child to acquire a mindset, attitudes, personal qualities and skills necessary for creativity. There are number of factors that contribute to this kind of climate for creativity such as parental engagement, attitudes, behaviors, and family rules and routines, together with other family experiences that benefit the child's emotional, intellectual and social development.

So far we know that parents who foster their child creativity show a specific set of behaviors, which constitute the climate for creativity. Such climate should contribute to the creative process in all its particular phases (Puccio et al., 2011): identifying the vision, gathering information, formulating challenges, exploring ideas, formulating solutions and implementing them. According to current research conducted in our cultural context (Kwaśniewska & Lebuda, 2017), climate for creativity in parent child relationships consists of four categories of parental behaviors (Encouragement to experience novelty and variety, Encouragement of nonconformism, Encouragement to fantasize, Support for perseverance in creative efforts), which are described in detail below.

Creative people grow up in the families which encourage their offspring to experience novelty and variety (Tennent & Berthelsen, 1997). Gaining knowledge about the world and realizing that things can be done in many different ways, and people may behave, wear, eat, etc., in a whole variety of manners, is beneficial for the child. This is the way in which information is gathered and a starting point for the child is to ask questions, formulate challenges. Wide knowledge about the world and the variety of information from different domains constitute the cultural capital which is important for further creative processes. In the home environment of creative individuals there are many books, magazines and musical instruments and children have multiple opportunities to enjoy a variety of experiences outside the home (Foster, 2004; Gardner, 1993). The families of eminent creators spend a large amount of time together, provide material and encouragement to support the existing aptitudes, stimulate new interests and provide challenges (Bloom & Sosniak, 1981; Csikszentmihályi, 1999; Gute, Gute, Nakamura, & Csikszentmihályi, 2008).

The parents of highly creative people accept or even, in some cases, encourage their children to nonconformism (Gardner, 1993; Gute et al., 2008). The child may experiment and act freely within the family's clearly described morals and values. The parents trust their children by believing that they will make the right decisions in particular situations (MacKinnon, 1962). Those decisions may differ from the trends identified within the child's age group. According to existing research (Miller & Gerard, 1979; Runco & Albert,

1985), accepting the child's independent thinking and self-reliance results in higher levels of creativity and greater creative and divergent thinking in the future. Due to nonconformism, the ideas generated in the creative process are characterised by novelty (Stein, 1953).

Innovative ideas have a chance of coming to live in the minds of people who can fantasize (Mellou, 1996). People with high levels of creativity had much space to develop their ability to fantasize in their childhood. Their parents engaged in activities that were not always perceived as useful or reasonable, such as: asking and answering silly questions, creative play, puppetry, filmmaking, and family concerts. They were also good storytellers, making up amusing bedtime stories; at times, they acted childlike, engaging in activities at the child's level; they also enjoyed writing and drawing (Foster, 2004). These families have a clear set of values which include imagination, appreciated even higher than good grades and health (Dacey, 1989).

Creative people in their childhood did not only learn how to generate novelty but they also understood how much effort one has to put into creating a new piece of work. The parents of highly creative children were supportive of their offspring's perseverance in creative efforts. Parents of talented mathematicians and composers were intensely involved in the development of their child's talents from an early stage (Bloom & Sosniak, 1981). They did not only offer enthusiasm and encouragement, they also served as models of passionate engrossment in the field, but cultivated integration by providing help in coping with difficult circumstances, gave verbal and emotional support, and exhibited high tolerance of failure (Gute et al., 2008).

The Climate for Creativity in Parent-Child Relationship Questionnaire

In above mentioned studies, various methods were used to investigate the impact of the home environment on creativity. The choice of the method depends on scientific assumptions about the nature of creativity. Researchers interested in Big C creativity (Kaufman & Beghetto, 2009) use qualitative analyses of biographies or retrospective interviews with eminent creators (e.g., Csikszentmihályi, 1996; Goertzel, Goertzel, Goertzel, & Hansen, 2004; Gute et al., 2008; MacKinnon, 1962).

Most of the studies conducted in the little c creativity paradigm (Richards, 1990) investigate the psychological characteristics of children and their parents. In such studies, the child's level of creativity is measured in various ways (Miller & Gerard, 1979). In most of this research, creativity tests and

questionnaires are used (e.g., Miller et al., 2012). In some studies, additionally, teachers are asked to nominate students who produce some observable evidence of creativity (e.g., Domino, 1969; Grant, 1973). The information about the child's creativity is then compared with the psychological characteristics of the parents (traits, values, attitudes and parenting style) gathered with the help of such tests as the California Psychological Inventory (Domino, 1969; Gough, 1975), Parental Attitude Research Instrument (Nichols, 1964; Orinstein, 1961), or the Parenting Styles and Dimensions Questionnaire (Robinson, Mandleco, Olsen, & Hart, 1995, 2001).

Since in family domain there is no questionnaire dedicated specifically to climate for creativity, in the present research a psychometrical tool measuring climate for creativity in parent – child relationship has been constructed.

General Characteristics of Climate for Creativity in Parent and Child Relationship Questionnaire

The Climate for Creativity in Parent and Child Relationship Questionnaire is a 24-item self-administered instrument developed primarily for parents of children of preschool age up to adolescence. It consists of four scales, that ask parents to assess their actions, that were mentioned before: Encouragement to experience novelty and variety, Encouragement of nonconformism, Encouragement to fantasize, Support for perseverance in creative efforts. Each scale consists of six items, some of which are reverse-coded in order to minimize the influence of the style of filling out the questionnaire. The items of each scale are placed alternately in order to reduce the risk of proximity error. The participants are asked to rate to what extent they agree with the items using a seven-point response scale. To reduce the social desirability effect, the questionnaire's title shown to the participants is the acronym of the whole title (CCP-CRQ) and does not reveal the true focus of the study.

Psychometrical Properties of CCP-CRQ

The validity of CCP-CRQ was controlled on the basis of its factor structure. To find out whether the CCP-CRQ is a single or multidimensional questionnaire, a confirmatory factor analysis (CFA) was conducted in which two alternative models of the latent structure of the tool were tested: one-factor and four-factor models. It was found that the four-factor model fitted the data

better, $\chi^2 = 3741.517$, $df = 246$, $p < 0.001$, RMSEA = 0.065, 90% CI for RMSEA [0.063, 0.067], CFI = 0.924; TLI = 0.914 than the one-factor model, $\chi^2 = 20315.602$, $df = 299$, $p < 0.001$, RMSEA = 0.141, 90% CI for RMSEA [0.139, 0.143], CFI = 0.597; TLI = 0.562, respectively, $\chi^2 = 16574.085$, $df = 53$, $p < 0.001$. The four-factor solution is characterized by a weak but acceptable fit, which means that the CCP-CRQ consists of four intercorrelated factors describing the climate for creativity in the parent-child relationship.

Each scale of the CCP-CRQ has acceptable reliability. The values of internal consistency determined by the conservative method of Cronbach's α range from 0.75 to 0.79. The reliabilities of the latent factors expressed as Hancock's *H* (Hancock & Mueller, 2001), are slightly higher and range from 0.81 to 0.85. These results indicate an average reliability of individual CCP-CRQ scales. The psychometrical characteristics of the four-factor model are presented in Table 7.1.

Limitations and Implications for Future Research

CCP-CRQ is not free of limitations. Since the questionnaire is a self-report instrument, it is important to bear in mind that it measures the individual's perception of the climate, not the precise objective picture of parental activities. Although climate is commonly investigated using self-report questionnaires (e.g., Hunter et al., 2007), it should be emphasized that surveys using this type of tool are open to several errors (e.g., leniency, central tendency, proximity, contrast error or social desirability bias).

To reduce the measurement errors in the CCP-CRQ, a wide range of psychometric requirements have been met. To this end, referring to the pilot study (Kwaśniewska & Lebuda, 2017), a number of indicators of each factor of the climate for creativity in parent-child relationship have been included and reverse-coded items have been used. Moreover, restrictive analytic methods such as confirmatory factor analysis have been calculated on the data from a study conducted by our team on 3073 participants (Kwaśniewska et al., 2018).

The questionnaire is in the process of being used in further research.

Firstly, we investigated if children whose parents score high in this questionnaire display higher results on creativity tests and a higher level of creative behaviours in their guardians' (teachers' and parents') evaluation, as well as in the self-assessment of their creative self-efficacy and creative personal identity (Karwowski, Lebuda, Wiśniewska, & Gralewski, 2013).

Table 7.1 Descriptive Characteristics and Standardized Factor Loadings of CCP-CRQ Statements

Scale	Statements	*M*	*SD*	Factor loadings	Maximum reliability	Cronbach's α
Encouragement to experience novelty and variety	I try to suggest to my child unconventional ways to solve problems.	5.12	1.33	0.578	0.81	0.76
	I point to my child the multitude of colors of life and its complexity.	5.94	1.14	0.631		
	I strengthen my child's ideas.	6.04	1.00	0.630		
	I organize my child's time so that he/she would have the opportunity to learn new things.	5.20	1.24	0.549		
	I like to improvise with my child in areas unknown to us.	4.98	1.42	0.697		
	I often encourage my child to think out of the box.	5.35	1.24	0.715		
Encouragement of nonconformism	I do not want my child to stand out from the group. (R)	4.13	1.79	0.630	0.82	0.79
	I get satisfaction from knowing that my child respects the designated boundaries also while playing. (R)	4.35	1.69	0.672		
	I make an effort so that my child's approach to life is pragmatic and down-to-earth. (R)	3.97	1.62	0.597		
	It is important to me that my child is always being polite. (R)	5.13	1.67	0.709		
	I prefer to choose for my child well-tested games/ activities also used by other parents. (R)	4.43	1.51	0.581		
	I am glad that my child has been taught not to break any rules. (R)	4.93	1.57	0.698		

(*continued*)

Table 7.1 (continued)

Scale	Statements	*M*	*SD*	Factor loadings	Maximum reliability	Cronbach's α
Support of perseverance in creative efforts	When my child has problems I support and motivate him/her to see many solutions.	6.03	1.02	0.751	0.83	0.75
	I always value my child's ideas even if they are far from perfection.	5.87	1.15	0.628		
	I try to show my child different sides of the same situation.	5.91	1.07	0.686		
	I show my child that making mistakes is natural.	6.37	0.90	0.677		
	I teach my child perseverance.	5.89	1.07	0.575		
	I attentively accompany my child through failures, because I realize that they teach valuable lessons.	5.61	1.24	0.609		
Encouragement to fantasize	I encourage my child to fantasize.	5.75	1.27	0.640	0.85	0.79
	I sometimes ask my child "silly" questions or respond in an odd way.	5.37	1.61	0.577		
	Together, we play original games and complete activities that others have never dreamed of.	4.46	1.63	0.632		
	While coming up with activities for my child I am open to his/her suggestions.	5.81	1.07	0.732		
	I sometimes engage my child in my "weird" ideas.	5.24	1.50	0.762		
	I talk with my child about imaginary, funny and strange situations and ideas.	5.69	1.26	0.739		

Note: All factor loadings are significant at $p < 0.001$. (R) – reverse-coded items

Secondly, as we know that parenting style is different with regard to gender (Dalton, Frick-Horbury, & Kitzmann, 2006), the issue of the relation between the mothers' and the fathers' perception of climate also needs further exploration. It is still unknown if there are differences between mothers and fathers when it comes to the aspects they prioritize in the development of creativity (Niedziałek & Kwaśniewska, in preparation).

Climate is usually measured from the perspective of all participants contributing to it (Amabile, 1996; Griffith, 1999; Isaksen et al., 2000–2001; Isaksen & Lauer, 2002; Kwaśniewska & Nęcka, 2004; Schneider & Duran, 2010; Van Houte, 2005; West & Farr, 1990). Therefore, in future research, it would be beneficial to include not only the parents but also the children and their perception of the four dimensions. For instance, a study comparing parents' and children's perceptions of family climate for creativity could suggest how coherent their perceptions are. Such research can only be conducted with older children who are able to answer the questionnaire in a reliable way.

Furthermore, since family influences are longitudinal (Runco, 2007), in further studies it would be beneficial to see whether the climate in a particular family changes over time and depends on the stage of the child's development.

Finally, considering the ongoing debate over the manifestation of creativity it seems reasonable to investigate whether the four dimensions of climate measured by CCP-CRQ influence creativity universally, regardless of the domain (Plucker, 1998), or if they help develop children's creativity only in some particular fields.

Potential Areas of Application in Psychological Practice

The Climate for Creativity in Parent-Child Relationship Questionnaire (CCP-CRQ) has been developed in order to measure the climate for creativity in the parent-child relationship. The questionnaire allows for identifying parental behaviors that promote creativity in four areas: encouragement to experience novelty and variety, encouragement of nonconformism, encouragement to fantasize, and support of perseverance in creative efforts.

Ultimately CCP-CRQ is aimed be a tool dedicated not only for scientific research but also for the psychological diagnosis of families. The norms are being created for various children age groups. The knowledge on how families function within the four specific dimensions gives a better chance to formulate strategies that support creativity in the family environment.

In conclusion, it is advisable for parents who care about their children's creative development to engage in four domains of education. Firstly, they can encourage their offspring to experience novelty and variety by creating a stimulating home environment and organising their family life around various kinds of intellectual and cultural stimuli. The experience and knowledge the children gain give them the raw material for further creative processing. Secondly, it is worth to approve and strengthen the child's individuality. If the child's behaviour is comprised within the value system set out by the caregivers, nonconformism to both explicit and implicit social rules, schemes and scripts can be accepted. Thirdly, to foster child's creativity it is worth to encourage him/her to fantasize by playing with imagination, experiencing art and culture, and sometimes engaging together in unconventional activities. Finally, parents should support their children's perseverance in creative efforts remembering that creativity includes also the process of learning through mistakes, failures, and periods of lower motivation.

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8

Life Positioning Analysis: Sociality, Materiality, and Creativity in the Lives of Carl Rogers and B. F. Skinner

Jack Martin

From Freud's studies of da Vinci (1910) and Moses (1939) to Erikson's studies of Luther (1958) and Gandhi (1969), to Gruber's (1974) study of Darwin and the multiple biographical sketches of Gardner (1993) and others, biographical case studies of creative individuals have played and continue to play an important role in creativity research. *Life Positioning Analysis (LPA)* (Martin, 2013, 2015, 2017) is a recently developed, biographical method for studying lives that gives priority to the social, interactional contexts within which individuals develop as a source of their psychological capabilities and characteristics, as well as their creative accomplishments.

LPA attempts to identify interactions that involve repetitive role reversals and changes in social positioning that enable individuals to experience what George Herbert Mead (1934) called *sociality. Sociality* is achieved when a person is able to occupy, more or less simultaneously, two or more positions within routine social interactions, especially when these positions are oppositional and/or reciprocal. Such *sociality* often is supported and mediated by the *materiality* of social contexts and the objects they contain. Think, for example, of young children learning to share toys. Sometimes a particular child is in the position of the *giver;* sometimes the same child is in the position of the *receiver.*

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Through repetitive exchanges of these positions, mediated by the handling and person-to-person movement of actual toys, the child is able to engage the actions and experiences of one position (e.g., *giving)* while simultaneously being able to experience the emotions and actions of the other position (i.e., *receiving).* Such repetitive exchanges of positions within routine interaction sequences, mediated by the materiality of social contexts and the objects that populate them, are extremely important socially and psychologically (Martin & Gillespie, 2010; Gillespie & Martin, 2014). Socially, the child learns to enter into the established practices of her family, community, and society as well as experiencing some of the norms and values of her culture. Psychologically, when the child learns to enact one position while anticipating and experiencing what it is like to be in the other position (because she has experienced the other position herself), the child begins to differentiate her self from others and to integrate such differentiations and the interpersonal insights associated with them into her own self awareness and self understanding. She is able to see herself as others see her because she has been immersed in the give and take of everyday interactivity with others. She is able to take the perspective of the other while acting from a different perspective and to know something of how she is affecting others and others are affecting her. When one imagines all the social, positional exchanges that young children experience repetitively in childhood games such as tag or hide-and-seek, as well as in actual and imaginative play involving the taking of different roles (e.g., feeding and being fed, being Mommy and little sister, and so forth), it is not difficult to understand how Mead identified such ongoing positionings and exchanges of positions as pivotal to the formation not only of self and other understanding, but also as critical for the exercise of agency and creativity. As the child acquires language and develops greater imaginative capability, her history of life positioning and exchange of positions with others allows her to anticipate how her actions are likely to be received by others and to modify them in pursuit of her desires and goals. Envisioning possibilities of how things might differ from what they currently are is an important off-shoot of this entire line of social, psychological development.

LPA is designed to examine individual lives for the particular, influential patterns of positioning and position exchange that have appeared in those lives. This is done through a series of five interactive steps. In what follows, each of the five phases of *Life Positioning Analysis* is explained and illustrated with examples drawn from the lives of influential and well known twentieth century psychologists, Carl Rogers and B. F. Skinner. Both helped found important schools of psychology (humanism and behaviorism, respectively) and demonstrated considerable creativity in their personal and work lives,

much of which has been well documented in their own autobiographical writings and in biographical accounts offered by others. What makes the choice of the lives of Rogers and Skinner especially appropriate for my purposes herein is that both were deeply embedded within the broader sociocultural context of twentieth century America, replete with its tensions between individual freedom and the necessity of some functional exercise of social control. These tensions were especially palpable during the 1960s when the two men debated each other on three separate occasions. Examples drawn from their lives and work show quite clearly how individuals who lived their entire lives in American culture during the twentieth century, nonetheless could adopt very different approaches in their personal development, in their work, and in their efforts at social reform. Both Rogers and Skinner were highly creative, but their creativity took dramatically different forms, in large part due to the particular patterns of life positioning within which they developed and learned to control and free themselves as creative agents capable of pursuing and accomplishing their personal and social goals. In the final section of this chapter, I briefly consider a few advantages and limitations of *LPA* as a biographical method for studying the lives of creative people.

Identifying Particular and Generalized Others

Procedural Guidelines

For most of us, particular others most likely to contribute to our social, psychological development are parents, caregivers, siblings, close friends, teachers, and colleagues with whom we interact frequently at different stages of our lives. Generalized others are the broader social and cultural contexts within which these interactions occur. Although potentially limitless, given the infinite aspects of sociocultural contexts that may be parsed in a wide variety of ways, the generalized others sought in *LPA* are limited to some of the most salient social conventions, practices, understandings, and ways of orienting to social situations that support the kinds of interpersonal activity and interactivity exhibited frequently and powerfully in the life or lives under study. Before influential particular and generalized others can be identified, much must be known about the persons and lives being studied. Consequently, the first task of the life positioning analyst is to engage in a comprehensive biographical study of the life particulars and circumstances of the individual or individuals she is interested in.

The ability of the analyst to identify particular and generalized others is a direct function of the relevant primary and secondary source materials that can be accessed. The biographical and historical work involved may be quite comprehensive, especially when many secondary sources of relevant information are involved (e.g., biographies and autobiographies, interviews and journal/newspaper articles, recorded lectures and debates on line, and many others). Primary sources include archives and collections of personal papers and effects, manuscripts and letters of the focal person(s), interviews conducted by the analyst in interaction with those that know or knew the focal persons best, materials and apparatuses used in the work of the focal persons, and a wide variety of other sources. The first-time analyst might well benefit greatly from reading and studying historical and biographical works by others and from studying and perhaps taking courses in historiography, interviewing, and qualitative methods.

The recognition of generalized others typically requires the analyst to attempt to enter into the social, cultural historical contexts within which the focal persons lived and their interactions with particular others took place. This requirement can be especially challenging if the life or lives being studied are very different from that of the analyst herself, perhaps set in very different cultures or subcultures and/or distant historical times. The extent to which the analyst can place the focal persons and their interactions clearly and convincingly within the contexts of their lived experience, the more likely it is that she eventually (in later phases of the analysis) will be able to engage in a productive interpretation of how their lives unfolded—i.e., how the life positions and perspectives they occupied and exchanged with particular others throughout their lives influenced their habits, orientations, and ambitions, the kinds of people they became, and the kinds of lives they led.

Examples

Both Carl Rogers and B. F. Skinner were sensitive children whose interactions with their parents were especially important in determining their life goals and strategies for pursuing them. Although they also were influenced by friends, colleagues, and spouses, their interactions with their parents will serve to illustrate more precisely how the nature of these exchanges produced the kinds of life positionings and perspectives that LPA seeks to uncover and interpret.

Rogers' parents were very religious in "a narrowly fundamentalist" manner. (Rogers, 1980, p. 27). So as to protect their children from sinful influences,

the family lived for much of Carl's youth in semi-rural, relative isolation. In consequence, Carl's childhood interactions with others were limited mostly to his five siblings and occasional visits with schoolmates who had his parents' approval. In this environment, Rogers later recalled, "it would never have occurred to me to share with them any of my personal or private thoughts or feelings, because I knew these would have been judged and found wanting" (Rogers, 1980, p. 28). Throughout his adolescence, Rogers felt like "a complete outsider, an onlooker in anything involving personal relationships" (1980, p. 29). Consequently, much of Rogers' early exchanges with others were marked by a social imbalance that placed him primarily in the positions and roles of observer and listener, as opposed to the positions and roles of actor and speaker. Some of the generalized others that enveloped and limited his interactions with his parents and others and fueled his frustration probably included religiously inspired ideals of the good, obedient child, an exemplary life of piety and submission to others and a higher power, and American cultural prototypes of self-sufficiency and personal freedom. He learned to observe, listen, keep his feelings to himself, and tend to his own upsets and joys.

Skinner's early years also included feelings of ambivalence toward his parents and the isolation of small town, rural America. Following his younger brother's premature death, Skinner was left alone to cope with his parents' demands and social ambitions. Fascinated by mechanical devices of all kinds, the young Skinner became adept at designing and building devices and arranging conditions that could help shift social exchanges in which he was *being controlled* to ones in which he was *in control*. In the first volume of his autobiography (Skinner, 1976), he provides the following example of such a positional shift in the context of his mother's attempts to get him to put away his pajamas, a kind of nagging and checking up on him that he found aversive.

> The clothes closet in my room was near the door and in it I fastened a hook on the end of a string which passed over a nail and along the wall to a nail above the center of the door. A sign reading "Hang up your pajamas" hung at the other end. When the pajamas were in place, the sign was up out of the way, but when I took them off the hook at night the sign dropped to the middle of the door where I would bump into it on the way out. (Skinner, 1976, pp. 121–122)

Skinner's ability to engineer his physical, interpersonal, and social environments in ways that shifted his social, psychological positioning and experience from one of being controlled by others to one of controlling himself not only

was reflected in many of his interactions with his parents and friends, but also reflected mid-twentieth century American cultural values of self-reliance and inventiveness, ideals about winning and losing in life and personal relationships, and self-control as a religious and social virtue.

Identifying Key Positions Occupied and Exchanged *Within* Life Periods

Procedural Guidelines

In this second phase of *LPA,* the analyst works through the primary and secondary source materials she has amassed in an attempt to locate particularly salient examples of important positionings, position exchanges, strategies of position exchange, and consequences of enacting such strategies at different phases of the lives of focal persons. The methods used to do this are the same as those used in the first phase of *LPA*. However, in this second phase the analyst seeks to identify different periods of the life or lives under consideration to set the stage for her subsequent consideration of similarities and differences in the kinds of positions occupied and exchanged throughout these different periods. In many cases, and certainly in the two cases used as examples here, the analyst may be able eventually to identify patterns and themes that connect across the life line(s) in question. Building on the first phase of *LPA,* this second phase culminates in a description of the life narrative in its chronological particulars, prior to moving to a more explanatory interpretation of life themes and patterns in later phases of the overall analysis. Once again, given space limitations, the examples that follow do not constitute a complete *LPA* of either Rogers or Skinner, but are intended only to illustrate the kinds of results that are expected to accrue from this second phase of the analytic process.

Examples

When, as an undergraduate at the University of Wisconsin, Carl Rogers had the opportunity of traveling as an American delegate to an international Christian convention in Peking, China, he was able to interact with others who espoused much more liberal, multicultural worldviews and perspectives than he previously had experienced, leaving him hungry for more life options but still lacking in the self-expressiveness that might help him secure them. Fortunately, during his graduate work in Counseling Psychology at Columbia

University, he gradually "learned that deep sharing with others was possible and enriching" (Rogers, 1980, p. 33). Nonetheless, having learned to "keep his feelings submerged, because expressions of feelings, particularly negative ones, were not welcomed" (Kirschenbaum 2007, p. 187), Rogers continued to struggle most of his life with intimacy. As he developed his therapeutic methods, he very gradually began to reveal more of himself and his own immediate experiences in his work with individual clients and groups.

After holding several prestigious academic posts, Rogers relocated to La Jolla, California where, associated with private human growth organizations, he conducted a wide variety of encounter groups during the 1960s and 1970s. In these settings, he eventually was able to move more easily between positions of active listening to others and genuine self-expression of his own immediate experiences. However, even then, in some ways Carl Rogers, remained "a man who was not at peace with himself … who was surrounded by love, but deeply lonely" (Kirschenbaun, 2007, pp. 476–477).

As Fred Skinner moved through adolescence and early adulthood, he continued his method of creating environments that would help him to control his social experiences and support his life and work. In high school, he and a friend constructed a shack for their own use as independent young men who were about to embark on their own lives. The shack was complete with a tar-paper roof, glass windows, bunk beds, and a small fireplace. There, the two boys could live at least some of their lives free from the control of others—a place where they could decide and were responsible for (i.e., in control of) themselves and their activities.

In his later professional and family life, Skinner's penchant for creating environments in which he was in control was reflected in his design and construction of a variety of "Skinner boxes," which he and other behaviorists could use in their conditioning studies of rats and pigeons, equipped to automatically generate and graph quantifiable experimental results. Later still, he invented the "air crib" to assist his wife Eve in the raising of a second child and the "teaching machine" as a way to assist children like his own daughters to learn on their own through automatically receiving immediate feedback about their responses. As a final example of Skinner's life-long adeptness at learning to control himself and his circumstances, and thereby reversing the positions and perspectives of being controlled with those of controlling, consider the following description of the workspace he designed for himself in old age.

> Near the study door there are comfortable armchairs, one equipped with movable metal arms fitted with a reading lens. Toward the far end of the study, facing each other on opposite walls, are a long wooden writing desk and a bright

> yellow sleeping cubicle, complete with stereo system, storage compartment for musical tapes—especially Wagner— and a timer which, with circadianlike rhythm, rang at five o'clock every morning for over twenty years to bring B. F. Skinner to his writing desk, like a monk to his matins. For two hours every morning, until the timer rang again at seven [he] … worked on … papers, articles, and books … (Bjork, 1997, p. 1)

Thematic Analysis of Positions and Perspectives *Across* Life Periods

Procedural Guidelines

This third phase of *LPA* moves away from a chronological charting of particular positionings, position exchanges, and strategic uses of both and begins a more explanatory interpretation of the life or lives in question. Now that the life narrative(s) has been plotted in its chronological particulars, it can be fleshed out thematically in terms of those threads that move through the entire life history, weaving it together and imbuing it with meaning and significance.

Examples

Overcoming the dogmatic, restrictive social positioning he experienced as a child and adolescent was a continuing struggle for Rogers over the course of his life and career. He was always a good listener, but struggled mightily to express his own innermost feelings and experiences. In the words of his primary biographer Howard Kirschenbaum (2007, p. 476), such self-expression was hindered by "the lack of unconditional love and acceptance in his childhood, the hurts inflicted by sibling rivalry, conditions of worth associated with achievement, and feelings of sinfulness engendered by family and religion." Rogers' eventual, if partial, solution was to develop a version of therapy (his client-centered approach) within which he could learn to be intimate with others and eventually to attain, although mostly in his later years, a level of comfort with some forms of self-expression. "The point of view I developed in therapy is the sort of help I myself would like" (Rogers, 1972, p. 58). Carl Rogers, like many other twentieth century Americans hungered for the freedom to be and to express himself, especially his deepest feelings, without censure. Such self-expressiveness was for him the key to a fulfilling and creative life.

Skinner's primary biographer, Daniel W. Bjork (1997), also has noted Skinner's life-long interest in construction and invention as means of meeting his own psychological needs and extending his interests. Skinner's personal and scientific originality and creativity seem to have derived at least in part, from a life of thoughtful tinkering with material artifacts that he molded into practical vehicles for behavioral control. In many ways, Skinner's life and work are typical of American invention and advance through 20th-century technologies—an unfolding drama that occasioned a mixed public response of perceived progress and promise on the one hand and significant anxiety and worry about being controlled by scientists and governments on the other (Rutherford, 2003).

The "Skinner boxes" he used in his conditioning experiments with rats and pigeons, his inventions of the "air crib" for babies and "teaching machines," and his careful engineering of his home and office workspaces, all exhibited, in function and fundamental structure, the same kind of shift to a position of control from positions of being controlled by others, events, and circumstances in his life. Whenever Skinner experienced himself in a position of being controlled, he learned to exchange such positioning and experience for one in which he was in control of his situation and behavior. In many cases, such exchanges were mediated in powerful ways by the materiality of objects and devices of his own invention and construction. In his own words, "I'm the person I'm most concerned with controlling" (in Hall 1972, p. 69). For Skinner, self-control based on knowledge of his behavioristic principles and processes was the most he or anyone else could expect in the way of personal development and growth.

Analysis of Integration of Positions of Perspectives into Life Narratives and Existential Projects

Procedural Guidelines

How people integrate and make use of the various positions and perspectives that have been central to their life experiences both within and across different periods of their lives is extremely important. The better the integration, the better the balance across different positions and perspectives and the more solid the basis for deliberate and creative action. If individuals can orient to and understand a variety of social situations and life possibilities from different

points of view, they are better able to plan their life strategies and projects and anticipate the variety of ways in which others might react to them. Such multiperspectivity and intersubjectivity are of great value in helping individuals to identify and plan their lives and life projects. Creativity often involves the consideration of a broad spectrum of possibilities and the ability to intuit and plan integrations of the most promising possibilities available. In this way, the rich integration of life experiences enabled by multiperspectivity and intersubjectivity is invaluable to the construction of life narratives and existential projects. It is no surprise that many creative individuals are in a constant process of becoming who they will be through the relentless imagination and pursuit of possibilities that they are able to discern in the patterns of their lives and the ways in which their identities and projects are interwoven across the various periods and domains of their ongoing experiences. This is why the life and work of so many creative people become indistinguishable.

Examples

Skinner's unique form of engineered self-management, one that built on his interactions with others and physical, material objects of his own invention, also was his existential life project. As Bjork documents, Skinner's greatest fear was the premature destruction of the world by human beings. Toward the end of his life, he increasingly invoked his behaviorist ideas as leading to a new way of living that might facilitate a new form of cultural life. This would be a culture typified by "a new kind of individual whose behavior could ensure cultural survival" (Bjork, 1997, pp. 232–233) because such individuals would finally be able to appreciate the potential consequences of their actions and take appropriately prescriptive action.

> Gone [would be] the old standbys of traditional individualism: character traits, conscience, and the inner man. Gone too … he hoped, would [be] the failing urban industrial environments—the faceless aesthetically ugly, bureaucratically controlled cities, with their contrived reinforcers such as wages. These would be replaced by smaller communities with life enhancing and ecologically preserving technologies that promised an end to punitive environments, whether they be maintained by governments, religions, or conventional technologies—a world, of course, much like his own utopian *Walden Two* (Skinner, 1948), in which the inhabitants all used Skinner's methods to control themselves and their circumstances.

"I am not trying to change people," Skinner insisted. "All I want to do is change the world in which they live" (Bjork, 1997, p. 233). In his life, work,

and attempts to save the world, Skinner drew from his experiences of controlling and being controlled to envision a better world, one in which individual freedoms would not automatically trump social, cultural goods and goals.

Where Skinner's social contributions and reforms adopted a combined strategy of self-control wedded to inventiveness, Rogers' contributions to social reform and harmony were built around person-to-person liberation and free expression. Having benefitted from facilitating the experiential expressiveness of others and struggled to develop his own expressiveness in ways that would liberate himself, Rogers became increasingly convinced that most social, intergroup, and international conflicts and crises could be ameliorated by facilitated, person-to- person encounters in which those with conflicting perspectives might learn to express those perspectives openly and come to better understand others and themselves.

Rogers sincerely believed that the person-centered approach was essential to world peace. In his final years, he, like Skinner, was deeply concerned for the future of humankind and planet Earth. Part of his motivation in leaving academic life and moving to La Jolla was to work to fashion a solution for tensions between groups and nations in conflict. In his cross-cultural workshops in Europe, South America, and elsewhere, he was touched by the fears and concerns of individuals he worked with who were experiencing the threats and actuality of bombs and missiles and the ravages of armed conflict. He worried about the future of humankind and became even more anxious to use his experience and knowledge in the cause of world peace.

Right up to his death, Rogers continued to write and work to bring his person-centered approach to personal and social life to the widest possible audience. This was a philosophy and method of learning to accept the ways of being that populated the innermost recesses of the life experiences of persons in a way that could free them of their self-doubts, frustrations, and pain, enabling them to experience themselves and others more fully and to enhance their existence as a process of becoming and valuing exactly who they are—the same process that Carl Rogers had found so helpful within his own life experience.

Writing the Overall Life Positioning Account

Procedural Guidelines

The construction and writing of a life positioning summary for the individual lives under consideration constitutes the final phase of *LPA.* This narrative is, of course, reflected in all of the foregoing examples included herein to illustrate

the process of *LPA.* Given space limitations, it has been possible to provide only a very few, selective examples of particular sociocultural positionings, position exchanges, perspectives, and integrations that helped to fuel the creative pursuits and accomplishments of two of the twentieth century's greatest and most original and innovative psychologists. However, I very much hope the preceding illustrations and the final examples that follow succeed in providing a concrete sense of how the process of *LPA* unfolds and leads eventually to the kinds of interpretations and conclusions contained in the various examples that I have drawn from the lives of Carl Rogers and B. F. Skinner.

Before turning to the final set of examples, I want to emphasize that although the five phases of *LPA* that have been described and illustrated herein have a definite ordering, in any complete *LPA* there inevitably will be much revisiting and movement back and forth amongst the various phases of the analysis, initially after a set of notes for all phases of the analysis has been compiled and again when various drafts of the analysis have been completed. The interpretation of lives is an extremely complex undertaking, so much hermeneutic "back and forth" and reconsideration is to be expected. The historical, biographical process of *LPA* will not lead automatically to a convincing, coherent narrative without a great deal of interpretive revisiting, double-checking, elaboration, and critical reflection. There is no easy way to cross off each phase as "over and done" enroute to an automatic and credible interpretation of the life or lives being studied. Just as individuals' lived experience travels back and forth with the aid of memory, imagination, interpretation, and reinterpretation, so too must the method of studying any human life.

Examples

Together, Rogers and Skinner captured and exemplified conflicting positions on a basic tension built into the American dream and American psychology—on one hand, the emphasis on and felt need for free self-expression that uniquely defines the American way of life and on the other hand the kind of disciplined self-control that is assumed to underlie American exceptionality. There can be little doubt that both men were themselves exceptional, both as psychologists and as citizens committed to social progress and reform.

Whereas Skinner preferred and engaged in methods of self-control, fueled by an inventiveness for engineering solutions and outcomes, Rogers preferred and engaged in methods of interpersonal engagement for facilitating resolutions to problems and conflict. Despite similarities in their rural upbringing

and familial dynamics, the two men reacted very differently to their early experiences in ways that displayed surprising endurance throughout their lives. Given these preferred styles and strategies for personal problem solving and development, it is possible to locate reliable patterns of consistency between the approaches of each man to his personal and professional life, patterns that also typified their preferred methods of social reform. So wedded were they each to these styles, self-control through innovative invention versus self- expression through therapeutic communication and engagement, that both men believed they could turn to these same approaches in their attempts to improve the human condition and to save humankind.

And yet, for all the positives that might be associated with Rogers' and Skinner's basic strategies of life positioning, as revealed from the *LPAs* of their lives and work, there remained seemingly intractable difficulties, in the form of imbalances, in the ways in which each man integrated these strategies and experiences throughout his life. For all of his accomplishments, Rogers never became fully comfortable with the free expression of his own innermost feelings, especially intimate feelings towards those he loved the most. Perhaps this is why so many practitioners of and commentators on his client-centered approach to counseling and psychotherapy have felt the need to add something more active to his therapeutic approach that might better balance listening and support with some kind of stimulus to action on the part of the client. For his part, Skinner became such a master of control and self-control that he struggled to understand the concerns that others, including Carl Rogers, had about his controlling approaches to both psychology and social reform. The fact that both men tended to assume that their own solutions to living also could and should be adopted by everyone else perhaps says something less than positive about the extent of their openness to the experiences and perspectives of others.

Conclusion

Whatever biological determinants might have played a role in the lives and accomplishments of Rogers and Skinner, the facts and interpretations discussed in this essay hopefully should leave little doubt in the minds of readers about the influential importance of the particular interpersonal, social, and broader cultural contexts within which Skinner and Rogers developed, both personally and professionally. Their lives demonstrate not only the ways in which the happenings and contexts of human lives give rise to our interests and projects, but how these interests and projects feed back into those life

contexts and enable further developments—in their case, important developments in twentieth century psychology that continue to reverberate in our present ways of thinking about our actions and experiences and about our individual and collective futures. Both men were undoubtedly creative—establishing through their life works new ways of thinking about and practicing psychology in the laboratory or therapy room and in real-life contexts.

As much or more than the work of any other psychologists, the life struggles and contributions of Carl Rogers and B. F. Skinner were directed specifically at the tension that inevitably exists in any human life between the desire for personal freedom and the necessity of personal control. The fact that the various positionings and perspectives related to freedom and control that they experienced in their own lives were never fully integrated probably explains some of their inability to understand each other and each other's perspectives more fully. In three debates during the 1950s, Skinner and Rogers tried their best to forge such an understanding. However, partial and misunderstandings remained on both sides. For Rogers, Skinner's penchant for inventive means of controlling behavior was non-problematic when applied to himself or perhaps to his experimental non-human animals, but when directed at other human beings it was inadequately ensured against possible violations of their freedom and choice. For Skinner, Rogers' insistence on valorizing individual freedom, uncoupled from the principles and practices of his own scientific behaviorism, ensured that no reasonable and defensible cultural planning would be undertaken. Perhaps creativity itself, demands a bit of blindness to the inevitable incompleteness that attends all human endeavors.

As an approach to the study of creative lives and work, *LPA*'s emphasis on the interpersonal and material particulars of sociocultural contexts and ways of living has the advantage of demonstrating how patterns of interactivity that are made up of actual roles, practices, and materials can help to constitute significant social psychological habits, orientations, and strategies that creative individuals apply to their living and creating. This is the main strength of the approach. When set against the tendency of many psychologists of creativity to emphasize the inner lives of creative individuals, whether in terms of personality factors or psychological dispositions and capabilities, such a focus on the interactional and material exchanges in the world outside the self can be instructive with respect to balancing the psychological with the sociocultural and suggesting that much that is psychological originates in interaction with the sociocultural contexts and patterns of creative lives.

Having said this, it also is important to recognize that *LPA* does not offer a complete approach to the analysis of human creativity. Not all creative habits and strategies originate in position occupation and exchange. For example, in

addition to experiencing and integrating perspectives through patterns and routines of interactivity, the literature on creativity is replete with examples of the importance of unique and apparently singular experiences that seem to play prototypic roles in creative lives. Certainly, not all creative predispositions are easily traced to the sociality and materiality of interactivity. Consequently, it is important to guard against over interpretation of lives using only the method of *LPA.* In most comprehensive studies of creative lives, interpretations based on *LPA* will need to be considered and related to interpretations derived from other biographical methods and perspectives. Nonetheless, as a procedure for helping to ensure that interactivity and materiality are not overlooked in the study of creativity and creative persons, *LPA* can play a useful role.

It also is important to emphasize that *LPA*, although concerned with documenting the sociality and materiality of positioning and position exchange, does not assume a strong sociocultural determinism. The developmental sequence that is assumed in position exchange theory (Martin & Gillespie, 2010) assumes that human agency is one of the most important consequences of the actions and interactions of infants and children with others and objects in their interpersonal, social, and cultural contexts. Once sequences and strategies of interaction and possibility gleaned from life positioning and experience have been ensconced in the psychological perspectives of adolescents and adults, such psychological tools can be refined, modified, and/or transformed in ways that reflect the imaginings and goals of creative persons. Moreover, such patterns of creative agency (and its development) are not restricted to the lives of highly creative individuals but can be located quite easily in the lives of ordinary people as we develop and access creative capability within our quotidian existences in more mundane ways.

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9

The Dynamic Display of Social Creativity: Developing the Method of Serial Reproduction

Brady Wagoner

Social creativity involves the weaving together of successive contributions of many people through time. The end result of this process is rarely predictable by any single individual in the group—in other words, novelty *emergences* at the level of a group or groups. This chapter introduces the *method of serial reproduction* as a research strategy to display and analyze this process. The method involves following a story, image or some other cultural material as it is passed through a group of people: as an experimental method, the first person shows his or her reproduction to a second, who in turn reproduces it from memory and shows it to a third, etc. like the party game 'broken telephone' or 'Chinese whispers'. The original experimental method was put forward by Cambridge psychologist Frederic Bartlett (1932) to study cultural diffusion and memory but has since been used to study a wide range of phenomena (for a review see Wagoner, 2017a, 2017b).

This chapter aims to adapt the method to exploring social creativity as a dynamic process enfolding over time. The argument put forward here will be developed in the following steps: First, Bartlett's theory of cultural dynamics is described as offering an approach to creativity seen as a constructive weaving together of material coming from diverse social and cultural streams; second, the chapter situates the experimental method of serial reproduction within this approach and provides concrete examples of its usefulness in the

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context of creativity research; and third, attention turns to using the analytic strategies of the method to investigate processes of social creativity outside the laboratory, 'in the wild' so to speak. Specifically, it explores examples of transformations in street art following the 2011 Egyptian uprising. In sum, the method of serial reproduction will be shown to be theoretically grounded in a fertile but little explored approach to creativity research and to be flexibly adaptable to different research forms and contexts, from the precision of the laboratory to the contextually rich field study.

Social Creativity in Cultural Contact and Diffusion

Cultural diffusion has been typically discussed in the creativity literature under the label 'innovation,' though standard models of creativity also recognize social validation of novelty as key. This approach, however, rarely focuses on the process of diffusion as itself creative, where something novel and useful can emerge. When transformation in diffusion is acknowledged it tends to be seen as a distortion of the original through its assimilation to old ideas and practices, as is generally the case in Rogers' (2003) justly famous book *Diffusion of Innovations*. This view of diffusion reinforces the idea that true creativity ('big C') is the domain of a select few individuals—what Glăveanu (2010) calls the 'He-paradigm' of creativity research—, who in turn spread their ideas like the vibrations of a sudden earthquake from a central point. From a more social and cultural point of view, deviations from an original can instead be seen as 'innovations' rather than simply 'distortions' of the original. Some recent theories in social psychology have aimed to re-evaluate cultural diffusion as itself a creative process in which genuine and productive novelties can emerge. Moscovici's (1976/2008) classic study of the diffusion of psychoanalysis in French society, for example, shows how scientific ideas are creatively appropriated to the needs of everyday thinking and social relations. Even earlier these creative dynamics were explored by the psychologist Frederic Bartlett in his work on cultural diffusion and social change. The focus of his approach is succinctly summarized in the following quotation:

> *Every normal man's activities are to a large extent socially determined, and whether he is aware of it or not, are directed towards the perpetuation and development of the complicated systems of culture characteristic of social groups. Consequently, the psychologist is as interested in culture problems as the ethnologist and the sociologist and he has his own special contributions to make towards the study of the growth, distribution, maintenance, and transformation of culture patterns.* (Bartlett, 1926, p. 769)

Bartlett is widely cited within the field of memory studies and has also been recognized as a forerunner of cultural psychology (Wagoner, 2017a), but he remains a largely unknown figure within creativity research. Although he never used the word 'creativity' as such (instead the word 'constructive' fills his *oeuvre*), his early work on cultural dynamics can easily be read within this framework. His approach can be understood in two main points: (1) people's action is situated within complex and evolving cultural patterns that are typical of the group(s) to which they belong—as highlighted in the above quotation and what Glaveanu (2010) calls 'we-paradigm' of creativity research—, and (2) that contact between social groups with different cultural patterns is the main stimulus to invention and change. Bartlett (1958, p. 147) says, "perhaps all original ideas and developments come from the contact of subject-matter with different subject-matter, of people with different people". This applies equally to artistic patterns in traditional cultures, the development of folk-stories and advances in scientific theories. In fact, Bartlett understood his own research innovations as the weaving together of different influences he encountered at Cambridge. In his early work *Psychology and Primitive Culture* (Bartlett, 1923), he uses the example of a decorative artist in an isolated group as a limit case. The artist might think that he is freely inventing a new design but in fact he is strongly guided by his group's conventions or cultural patterns, such that he feels compelled to put a kink in each curve rather than having it be smooth, and create a certain harmony and balance of parts within the design that is an implicit norm within his group. Without contacts with other groups with different ways of making designs little invention is possible:

> *He may analyze; he may be the source of much reduplication; he may make new patterns of the old material; he may introduce peculiar interpretations; but in the actual invention of new detail he is practically helpless, unless he has access to communities outside his own and of a different culture. It is this, beyond anything else, which… acts as the spur to those constructive processes as a result of which new forms of social organization may be achieved; new cultures produced; and radical changes brought into being.* (Bartlett, 1923, p. 238).

The trajectories of change groups take in situations of cultural contact will depend on several factors, including the power asymmetries between them, whether an individual or group makes the contact, and the cultural norms specific to each group. The most conducive relation for creativity and the construction of new cultural forms is symmetrical and non-antagonistic, like a free-flowing discussion among equals. Under these conditions cultural forms

flow freely between groups and tend to be adopted as separate units, according to specific interests and perceived utility. In contrast, where there is strong asymmetry between groups (e.g., in colonialism), whole bundles of a culture are imposed on the submissive group, but are interpreted on the basis of their own cultural norms. Thus, changes are still introduced into the foreign material, as can clearly be seen in how Christianity has taken on different forms in groups around the world. In all cases of contact, cultural elements of one group will be shaped by the cultural patterns of the receiving group, a process that was labeled 'conventionalisation' by Bartlett's mentor W.H.R. Rivers (1912).

The greater the differences in cultural patterns between the groups, the greater the changes that will be introduced into the material in their diffusion. The founder of Cambridge anthropology A.C. Haddon (1895) had provided amble ethnographic material on the variations of decorative patterns within and between groups to substantiate this claim (cf. Glaveanu's (2014) study of Easter Egg designs). Rivers and Bartlett after him extended the approach to cultural patterns in general. However, Bartlett added that cultural material was not only *assimilated* to the receiving group's norms but was also changed "positively *in the direction along which the group happens to be developing*" (Bartlett, 1932, p. 275). He called this process 'social constructiveness,' which involves weaving together material from different sources into a new cultural form or social organization.[1] For example, he describes the development of a new religious cult among Winnebago Native Americans, which first grew up around the introduction of the drug peyote into the group and later incorporated Christian objects into its practices (Bartlett, 1923, p. 164ff). In other words, it developed over time through different cultural contacts, the outcome of which could not be predicted in advance by any individual. Here creativity is situated between creative agents and the different cultural streams that they are in contact with.

The Method of Serial Reproduction: Toward Creative Reconstruction

Having outlined some of the main features of Bartlett's approach to creativity as a cultural process, we will now explore the key method he developed to study cultural transmission and transformation—namely 'serial reproduction'.

[1] Bartlett was here synthesizing two competing anthropological approaches of the 1910s: cultural evolution and diffusionism. The former emphasized everyday creativity of people within a society, while the latter pointing more to the spread of innovations from a few sources. In Bartlett's approach contact with outside society serves as a stimulus to creativity from within it (see Wagoner, 2017a, 2017b).

The method begins with showing a participant a story or image from foreign culture, which is thus unfamiliar to them. After fifteen minutes has elapsed, a participant is asked to reproduce the material from memory. Their reproduction is then shown to a second person, who does the same, and so on. Figure 9.1 from Bartlett (1932) illustrates what happened to the ancient Egyptian hieroglyph of an owl (top left corner) when people living in England in the 1910s serially reproduced it. Through the early reproductions in the series we see how the design became more oval shaped and its inner features became less clearly connected. Then in the eighth reproduction what looks to be a tail appears, suggesting that the participant interpreted the design to represent some kind of furry animal. The following participant makes the figure much more distinctly cat like: the ears grown in size and the inner markings become shading and a collar. In the next reproduction the design is clearly of a black cat, where even whiskers are added. There is then very little change in reproductions to the end of the series, besides the moving of the tail. At this point, the design has become a conventional representation in the culture it is circulating in. In contrast to the original owl figure, people recognize the cat immediately and

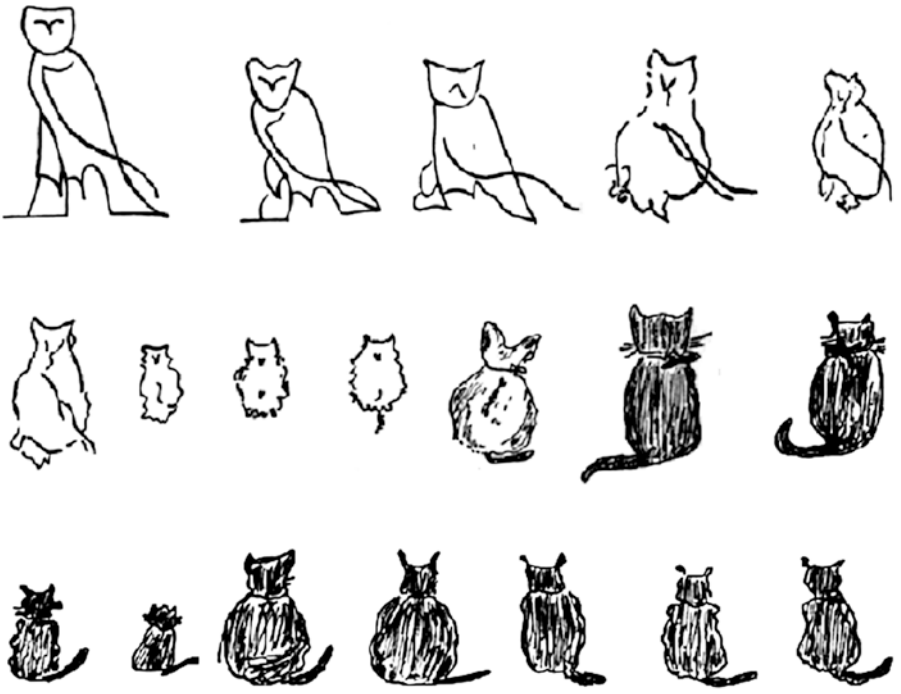

Fig. 9.1 Serial reproduction chain for an ancient Egyptian hieroglyph. (Bartlett, 1932, pp. 180–181)

can reproduce it rapidly. As mentioned above, the foreignness of the material leads to greater changes as it is worked into the receiving group's cultural patterns.

Bartlett's (1932) original use of the method beautifully captures the *assimilation* of unfamiliar material to conventional cultural patterns. This is accompanied by *simplification* and *elaboration* of the whole design and its parts as well as *the retention of apparently unimportant details* from the original. However, just focusing on these features highlights the conservative aspects of change and only minimally creativity. The method as Bartlett used it is less fitting to explore the construction of novelty, as the instructions for each participant were to reproduce the design as it was rather than adding something new to it. Moreover, in everyday life it is rarely the case that we are asked to reproduce something literally; instead we adapt material to new contexts and audiences, mixing and blending it with other material as Bartlett (1923) described from ethnographic sources. To highlight these more open, creative dimensions of cultural diffusion the task instructions were changed to encourage addition of new details into the design. Figure 9.2 illustrates how an image of Thor's hammer (from Viking times) changes in serial reproduction when groups are given different instructions: One group was to 'reproduce the image as it was,' and the other to 'add something to the image'. Each participant was also asked to write a brief description of what they drew so that the researcher could better understand their interpretation of the design. This data was collected in Recife (Brazil) with the help of Rie Torp Hansen and Eva Aavitsland Storå. For the sake of brevity, only the 1st, 5th and 10th reproductions in each chain are shown in the example.

In the first reproduction of both series we see a marked *simplification* of the figure, in which many of the details of the original are lost and the shape becomes more uniform. The detail added in the second 'add something' series, a cross inside the circle at the top, is a rather minor addition and in no way significantly changes the design. In the reproductions to follow this detail is *conventionalized* into a Christian cross, as can be seen in the upper left region of the figure in the 5th reproduction. However, its presence promotes the inclusion of many similar elements into the design in reproductions after the first, such as the Brazilian flag with peace[2] written under it (in top right), Star of David[3] (in upper middle) and flower (in the lower left). These ele-

[2] The word 'peace' under the Brazilian flag makes sense in the context of the political upheavals Brazil was going through at the time of data collection, especially protests for and against the impeachment of president Dilma Rousseff.

[3] Recife is home to the first Jewish synagoge in Latin America, dating back to the Dutch settlement there. The jews fled the city when the Portuguese took over but many jewish symbols found their way into the local culture. For example, the star of david can be found on local coyboy hats!

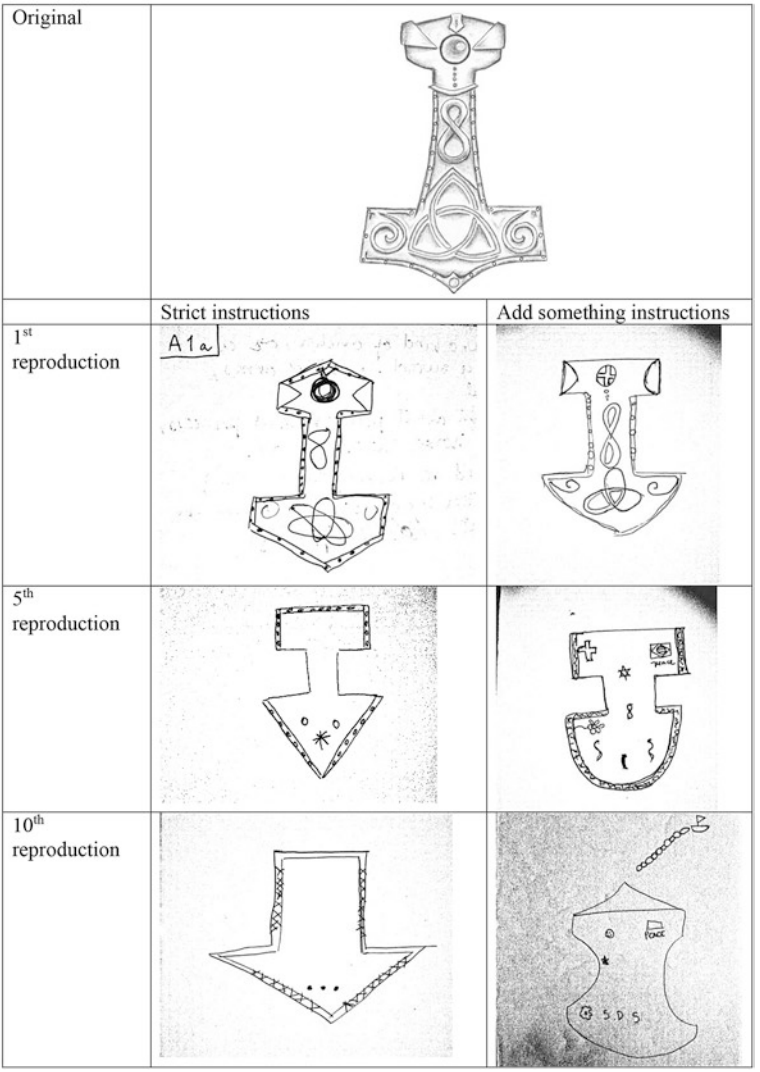

Fig. 9.2 Comparison of serial reproduction chains resulting from different task instructions

ments are all familiar symbols within Recife (see footnotes 2 and 3) and as such after they are introduced they tend *persist* through several reproductions. The other elements in the design (at the bottom) have started to look like Ss and a crescent moon (and later become clearly the letters 'S D S'). In the strict instructions series (left) by contrast, the 5th reproduction has been stripped of much of its details—only a star and small two circles remain inside the design (in both series some feature in the border pattern has been retained

and *duplicated*). By the 10th reproduction, the design in the strict instructions series has become the familiar form of an arrow sign with a few outstanding details (as also found by Bartlett, 1932), while in the 'add something' series an interesting innovation has occurred: the outer field has been elaborated with a boat and chain, transforming the earlier figure into an anchor. This addition occurred in the 9th reproduction but was facilitated by an addition to the top edge of the design in the 7th reproduction, which becomes the feature that the chain attaches to. In other 'add something' series, it was also found that transforming the border would often lead to a qualitative breakthrough, where a participant rethinks the task and develops the design in a novel way. However, in other cases the task is interpreted as an expansive one from the first reproduction, as in the following series collected in Buenos Aires.

This series effectively starts where the Recife 'add something' series ends, but with more details of the original design retained. The first reproduction is more artistic in its execution than most (e.g. care taken to get the details right and create a balanced composition), which sets a strong frame for future reproductions in the series. It also highlights that individual initiatives remain important even within a process of social creativity. Moreover, starting the series with a major change to the design seems to encourage more rapid and significant changes throughout (especially when compared with the add something series in Fig. 9.2). As the series progresses, the new background detail of boat and chain becomes increasingly *elaborated* while the original figure in the foreground is increasingly *simplified*. This also occurred in other 'added something' series in which a background feature is added—the whole design tends to morph such that the new features come to the fore. By the end of the present series, the background and foreground are given equal weight in the whole design. Looking more closely at the details, first buildings are added behind the boat, which is followed by expanded water and land indicators, as well as birds. The 3rd reproduction in the series changes the design to imply that the anchor (now unambiguously so, as it has been changed into a conventional form) is being thrown by someone from a window in one of the buildings (the motion of which is indicated by the arrow). In the following reproduction the anchor becomes a boat. Although similar in form to the sailboat that disappeared with the 3rd reproduction, it is now more of a tugboat as the rope has become smoke coming from the boat's chimney. The final reproduction in the series only added trees on the beach and simplified other aspects of the design.

In summary, we see in these examples how the modified method of serial reproduction can be used to explore social creativity within a cultural

framework. Though it we can see tendencies and conditions that promote and inhibit rethinking of the task and qualitative breakthroughs in design. The most significant transformations tended to occur when participants *extended* the design into the surrounding field, which could be thought about as a gestalt switch from foreground to background. In other contexts, we might ask how a group's exploring the border and outer field of some design can lead to creative changes in it. However, an experimental method also comes with a number of limitations which we will try to overcome by extending the analytic focus of the method on qualitative changes through time to ethnographic research.

Street Art as a Real World Example

Bartlett's laboratory-based method can be helpful to trigger, display and analyze the emergence of social creativity in reproduction chains. However, it is important to also acknowledge the limitations of this method. For example, rather than finding a linear chain of reproductions, in real life settings exposure to material is usually *repeated* and *redundant*, and chains *proliferate* in multiple directions (Morin, 2011, p. 125ff). Bartlett (1932) himself was well aware of the artificiality of the laboratory and whenever possible tried to bring his methods closer to everyday conditions. Moreover, after having completed his experiments on the psychological mechanisms involved in conventionalization, he set out to develop a broader theory of cultural dynamics, which as we saw above included the complex social relations and conditions that shape processes of cultural diffusion (Bartlett, 1923). In the rest of this chapter my focus will be on using Bartlett's analytic focus on qualitative changes in material through time to explore real world examples of social creativity in graffiti that were produced in Cairo following the 2011 revolution (see also Awad, 2017; Awad & Wagoner, 2015, 2018; Awad, Wagoner & Glaveanu, 2017).

Graffiti and other forms of street art are distinct aesthetic expressions in that they are by nature at the whims of various social actors and thus tend to ephemeral in their original form (Awad & Wagoner, 2017). However, precisely because of their vulnerability to being erased or changed, they take on a more dynamic existence. The artist and other people take pictures of murals and post them in online forums where they are commented on and debated by others. An image might also be painted in other parts of the city or repainted in the same place with modifications that ironize those that erased it (Wagoner, Bresco, & Awad, 2018). In some cases, the continuous changes introduced into street art, especially murals, resemble a visual dialogue

between people with different points of view on a contentious social issue. As researchers we can follow this dialogue as it evolves over time and analyze it as a form of social creativity. Social psychology teaches us that tension and conflict between perspectives can be highly generative and bring about social change (Markova, 2003; Moscovici, 1976).

In what follows I will analyze three examples of street art images that have been significantly transformed over time in order to illustrate different directions and dynamics of change within a specific social-political context. These examples highlight how image transformations are embedded within a dynamic situation, including complex social relations, and are responsive to new events. Thus, unlike the changes introduced in the serial reproductions chains in Figs. 9.2 and 9.3, here additions are clearly seen as responses to the wider social and political changes of a society (though the Brazilian flag with 'peace' written under it is also clearly an example of this).

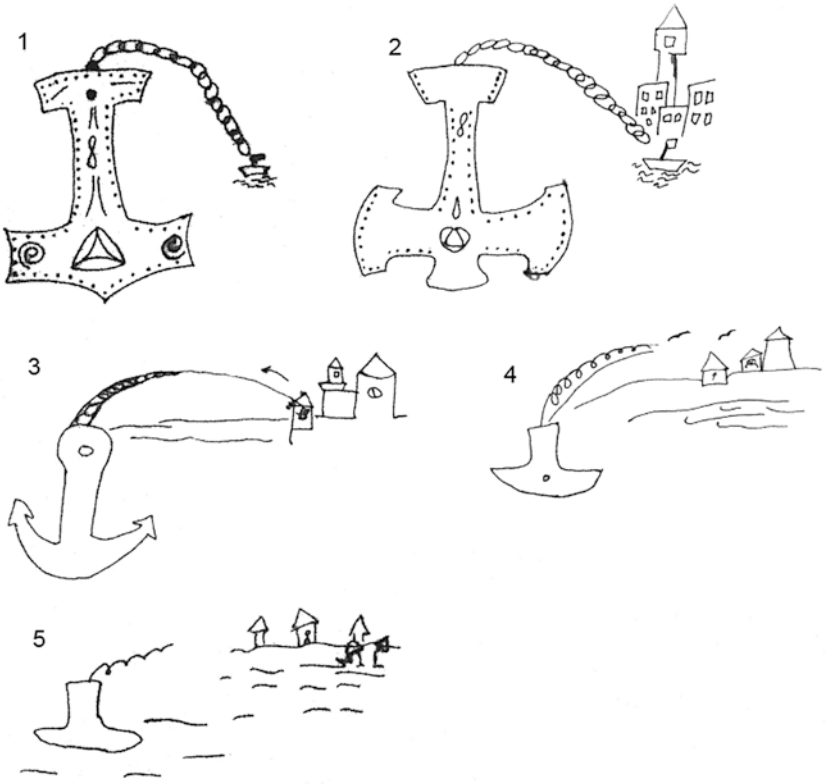

Fig. 9.3 Add something series from Buenos Aires

Example 1: Additive Transformations

The first example in Fig. 9.4 will help to outline the context and development of the January 2011 Egyptian revolution and its aftermath. In this case the same street artist, who calls himself Omar Picasso, painted all the images but at different times. The first image in the series was made in the transitional period that followed the nationwide protests that started January 18th 2011

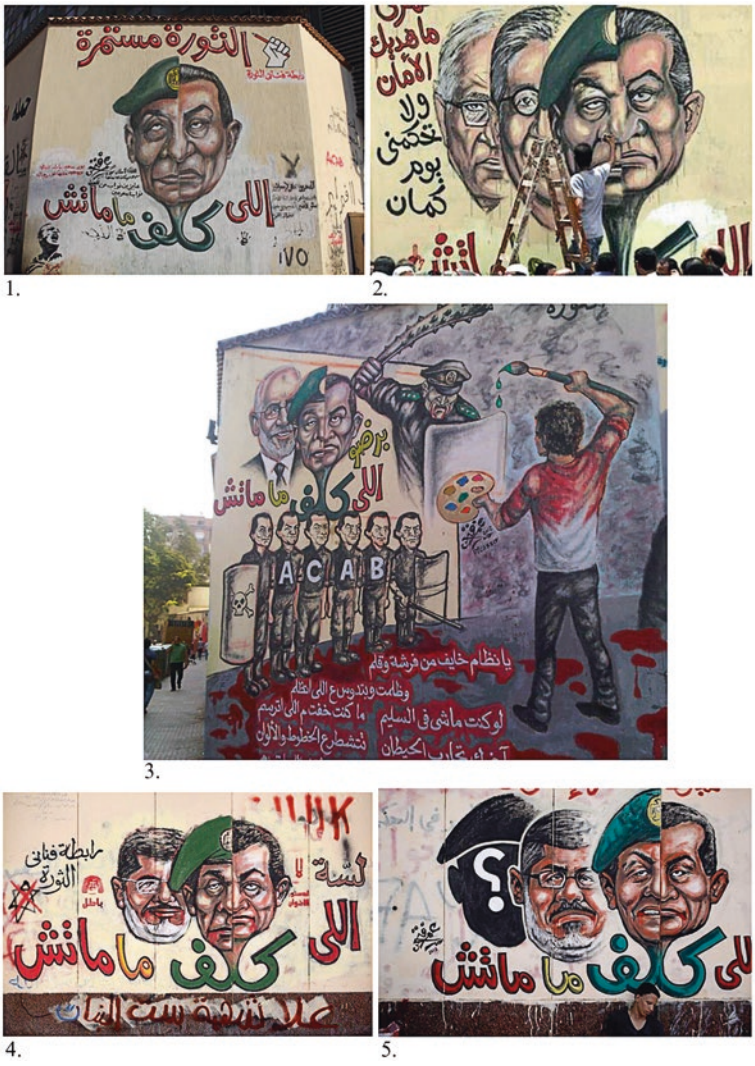

Fig. 9.4 Changing faces of the regime by Omar Picasso

and 18 days later successfully led to Mubarak's removal from the presidency, a position held for almost thirty years. Murbarak is depicted on the right and field marshal Tantawi on the left. The text underneath says, 'those who delegate power never die' which is an ironic play on an Egyptian proverb, 'those who have children never die'—thus, implying that Mubarak lives on through Tantawi's military government, SCAF (the Supreme Council of Armed Forces). Intensified and brutally repressed protests in November 2011 forced Tantawi to speed up the presidential elections, which were held in May and June of 2012. The second image was made in the period leading up to the first round of the presidential election that took place on 23 and 24 of May 2012. In the image two former members of Mubarak's political party who were running for president, Amr Mousa and Ahmed Shafik, are depicted behind Tantawi. Again the king is dead, long live the king! In the second round of the election held in June, Ahmed Shafik lost against Muslim Brotherhood candidate Mohamed Morsi.

The third image was painted in October 2012 and elaborates a complex scene that adds further context to the original design, in which Muslim Brotherhood leader Mohammed Badie (who was said to be controlling things behind the scenes, despite Morsi being the official president) has now been placed behind Tantawi. In some ways it resembles what happened with the addition of a boat in the 'add something' serial reproduction series above in that the original figure recedes into the background and other features are introduced that situate it in an elaborate scene. Here the faces of the authorities are being protected by riot police (ACAB is an international expression meaning All Cops Are Bastards) and a fanged military officer with shield and a primitive club raised in the air. The club is juxtaposed to the paintbrush held by the artist, whose clothing suggests the Egyptian flag. In addition to the flag we are literally positioned in solidarity with the artist, as we both face the authorities and brutality of the security forces. The text below the image further extenuates this feeling: "A regime fearing a paintbrush and a pen; an injustice system that attacks the victim; if you were righteous you wouldn't have feared what I draw; all you do is fight walls and show off your power on paintings; but inside you are a coward; you will never rebuild what has been destroyed."

The fourth image is simplified again to the key motif of the faces of the regime, perhaps signaling a loss of optimism. It differs from previous only in that president Mohammad Morsi now occupies the place behind Tantawi. The final image in the series was done during widespread protests just before Morsi's removal from power by the military in June 2013. Behind Morsi is a silhouette of someone wearing a beret, suggesting that the next ruler that will

continue the pattern will be from the military. Interestingly, the artist himself was ambivalent about this amidst the euphoria of having ousted Morsi and erased it the follow day. However, his prophecy was accurate: power was quickly consolidated by the military leader Adel el-Sisi, who in 2018 is currently president and shows no signs of giving up power any time soon. Through the series core image shows itself to be highly effective at incorporating new developments to express the pattern of continuity in the powers that be against the many changes in the regime. It tells the story of the post revolutionary period through visual objectifications in a series of rulers and potential rulers, being both retrospective and prospective.

Example 2: The Elaboration of Meaning Together with the Simplification of Form

The second example concerns the diffusion and transformation of the way a single event is represented—see Fig. 9.5. During a protest at the time of the transitional military rule, a woman running from military forces was grabbed by them and attacked. While being beaten and stomped on her black *abaya* (full veil) came undone revealing her jeans, stomach and blue bra. The incident was captured in photo and video (see first image below) by people providing evidence of military brutality during this sensitive period and leading to a surge of protests, in which women were particularly well represented. The event was first portrayed in a matter of fact way in street art, where the woman is beaten by military men (in image 3 and others like it). The women herself did not want to be identified because of the shame that comes from public nudity, but protesters began referring to her as 'our noble lady'. Some even posted images of themselves in a blue bra wearing a Guy Fawkes mask and holding a sign that says "Shame on you SCAF". At this point, artists began to represent the protestor as a kind of superhero, thus *transforming the disempowered image into an empowered one*.

In the final phase the event came to be represented simply as a blue bra, which condenses the multiple meanings of solidarity with women's rights, protest and the values animating the Arab Spring. The simplified blue bra images can be seen in other Arab countries. It was made by artist Bahia Shehad as part of her calligraphy project "A thousand times no," in which she investigated different calligraphy styles for writing no in Arabic. Underneath each 'no' is written a different message, such as 'no to stripping protestors,' 'no to military rule,' and 'no to violence'. Thus, the blue bra also takes the form of the Arabic word for no—it is the only symbol without text under it. In short,

Fig. 9.5 The blue bra becomes a simplified symbol of empowerment

we see in this examples a series of phases through which an event is represented, ending in a simplified symbol that condenses a multitude of meanings. This process of simplification was also found be Bartlett (1923, 1932) in both his analysis of ethnographic material and experimental data.

Example 3: Transformative Visual Dialogues

Whereas Fig. 9.4 dealt with a single artist's modification to an image repainted in the same place in response to the changing political situation, Fig. 9.5 dealt with how a single event was reconstructed by different people in different places. In contrast to both of these, Fig. 9.6 illustrates the progressive elaboration of an image on the same wall by multiple actors responding to new events but also directly to one another's changes (see also Awad & Wagoner, 2018). The original image titled 'Tank versus biker' was painted in

Fig. 9.6 Transformations of 'Tank vs. Biker' from 2011 to 2012

late May 2011 by street artist Ganzeer. It beautifully captures the uneasy, but not yet openly hostile, relationship between military and citizen. In a sign of disproportionate power, the tank (representing the military) points its canon in the direction of the biker (representing the Egyptian citizen), who carries a tray of bread, which is a staple source of food in Egypt. The chant of the revolution was 'bread, freedom and social justice'—in Arabic the word for 'bread' (*aish*) also means 'life'. Interpreted through the lens of positioning theory (Harré & Langenhove, 1998), the image seems to say that the military has a *duty* to use its disproportionate power to uphold the *rights* of citizens.

In October 2011 the uneasiness proved well-founded when 25 Coptic Christian protestors were killed by the military (referred as a the Maspero Massacre), some of whom were run over by tanks. A graffiti artist named Khaled responded by painting people dramatically struggling beneath the tank's treads in a pool of blood. To the right of the tank, beside the biker, are protestors holding Guy Fawkes masks (an international symbol of resistance). The implication now is that the military has infringed on citizen's *rights* to life and freedom of political expression, and as a consequence citizens have a *duty* to protest to secure basic rights. Ten days later, an opposing group called the 'Badr Battalion' erased the new addition of the people crushed under the tank

and replaced the Guy Fawkes masks with Egyptian flags. Thus, the tank is now depicted *beside*, not *against*, protestors; this is further clarified by the inclusion of the slogan "the army and the people are one hand," which was a common expression at the beginning of the revolution in January 2011. The implicit argument is that citizens have a patriotic *duty* to support the military, which will bring social stability to the country.

In response, a group of street artists replaced the motifs to the right of the tank with a giant SCAF monster devouring a female protestor (done by 'Winged Elephant) and a mix of figures in a yellow cloud, including a flower of Tantawi's face as the pedals and an image of an Egyptian soldier who in 1985 killed seven Israeli tourists, flagged on each side by Lenin (done by an artist group named "Mona Lisa Battalion"). While the monster clearly portrays the military as a violent savage, the meanings of these figures in the cloud are rather opaque and not likely to be easily decoded by passer byers. For example, the 'corrupt flower' (so called by the artist group) is probably making an ironic statement that the revolution flowers with Tantawi's military government (for a discussion of irony in relation to the past see Wagoner et al., 2018). In the final image the monster's face has been blacked out by someone pro-military and figures in the cloud erased. In their place, symbols from the 'one thousand times no' project (discussed above) have been added as well as a sign saying 'Tahrir is your address,' being run over by the tank which is once again actively repressing protest. Thus, it implies citizens have a *duty* to protest in Tahrir against the thousand infringments of their *rights*.

* * *

All three series illustrate how local and international symbols are mixed in new ways in order to represent the present and project particular futures for the country—what Bartlett (1923, 1932) called 'social constructiveness' (see above). For example, in Fig. 4.3 A.C.A.B. is written in English and is an international street culture expression, while the text in Arabic plays on a local proverb. Both work together to make a statement about new rulers in Egypt. Likewise, the bra has long been an international symbol of female empowerment but it takes on particular characteristic when used in this context following the stripping of female protestors, which has the potential here to lead to shame. Thus, images have genres and build on a longer history, developing that history in the process. This is similar to the way Bakhtin (1986) argued that: "any utterance is a link in the chain of communication" (p. 91) and "is related not only to preceding, but also to subsequent links in the chain"

(p. 94). To paraphrase, images and words are responses to others, past and present, and live on the boundary between their own context and another alien context; they become creatively employed precisely on this boundary.

Conclusion

This chapter has explored the method of serial reproduction by first outlining the theoretical framework from which it is derived and second illustrating the method with analyses of empirical material, either triggered by an experimental procedure or collected through photo documentation as part of a field study. The remaining space of the chapter is devoted to stepping back to highlight some of the methodological issues involved in using the serial reproduction to study social creativity—namely, the questions asked and the steps of the analysis. First of all, it should be emphasized again that the principle function of the method is to track and analyze social creativity as a *process* that takes place over a period of time through successive attempts at reconstructing an image, idea or event. In this way, it overcomes the *process-product* disconnection that has dominated creativity research at least since Rhode's (1961) 4 P approach. Instead, the two are here combined such that products are seen in view of social and psychological processes. The main questions asked are what kinds of creative transformation are occurring in the material and how are they conditioned by various social and cultural forces. There are two main steps involved in employing the method.

The first step of the method requires producing or collecting a *series* to analyze. In its experimental form this involves looking at how foreign images and symbols are elaborated and simplified through a chain of reproductions, which are progressively extended in different directions. Future studies might try out different task framings to see how they condition directions and kinds of transformation through the series. For example, Hall (1950) found that simply adding a name to a figure has dramatic effects on how it is serially reproduced. With field data the *unit of analysis* is more varied and requires photo documentation of a site (or a collection of stories on an issue) over an extended period of time. In the case described above we looked at (1) a single artists' representation of the ruling regime and its history, through (2) the depiction of a single event in different representations that emphasis different values, and (3) how the same image is used to represent different ways of seeing the relationship between military and citizens. Thus, the 'site' can here be understood as a specific physical location or symbolically as the successive transformation of an idea, figure or event within a broad cultural context.

Moreover, the researcher should not stop with the image itself but also try to gather people's interpretations of it. This shows how creativity is both historical and embedded within a network of social relations.

Second, once the researcher has a series of images or stories in hand a strategy for analyzing them is required. The *focus of the analysis* with this method involves highlighting different *kinds of qualitative changes* introduced into the material *through* the series, while searching for wider social cultural factors that they are responding to. Bartlett's work and others who developed it provide many useful analytic concepts to this end, such as *simplification, elaboration, duplication, conventionalization, condensation, transference, recasting*, etc. (see Wagoner, 2017b), but researchers can themselves be creative in inventing new terms that best capture the kinds of qualitative changes found in their material (one example from the above is the process of *extending the outer field* with the 'add something' experimental task instructions). The most important point here is that the series should not be read as a succession of static snapshots but that the researcher should also read *between* reproductions and aim to reconstruct the series *as a whole* (highlighting the interconnectedness of product and process). The aim is to explore various tendencies by which materials change under different conditions. This can be facilitated by looking beyond the images themselves to how they were interpreted by participants. Through the categories used to describe material, we can see how they are being 'anchored' in people's existing social frame of reference. It also shows us how multiple meanings and values can be condensed into a single simple image—as in the case of the blue bra discussed above. Thus, the creative process can be shown to branch out into different social varieties of a form and to come together in a new synthesis of form within culturally and historically shaped networks.

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10

Microgenetic Analysis and Creativity: Analyzing Psychological Change Processes

Mônica Souza Neves-Pereira

The construction of scientific knowledge has historically been characterized by rigor and precision, but one that cannot dispense with creativity and imagination in its practice. For it is the latter that allow for the renovation in the field, the expansion of theoretical and methodological paths, and the creation of new ways of producing science. The technological, social and cultural transformations that emerged in recent decades are challenging the sciences to construct original methods, so they can meet the needs of addressing increasingly complex research issues. This reality is particularly acute in the field of psychology, which has been revisiting and enlarging its objects of study (Brinkmann, Jacobsen, & Kristiansen, 2014). The demand for innovative methodologies is required. The primacy of quantitative approaches for data collection and analysis need to open spaces for the expansion of qualitative research methods, which encompass the investigation of phenomena not covered by numerical data and statistics. Understanding psychological phenomena demands a deep kind of immersion within human psychological processes, with their specific movements and transformations. This immersion calls for a qualitative outlook in order to better describe, explain and understand human and social processes in development.

This chapter sets out to discuss the contributions of microgenetic analysis as a representative of qualitative methodological approaches in the context of the cultural psychology of creativity. Studies carried out in Brazil by the author

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will illustrate the use of microgenesis to investigate the phenomenon of creativity with a focus on the psychological processes of construction, change and transformation during both data collection and analysis stages. By considering a scientific investigation as a phenomenon conceived and planned by humans in distinct physical, psychological and socio-cultural contexts, under the dominion of the irreversibility of time, in which researchers and participants co-construct their results and mutually influence each other, we can understand the importance of methodologies that approach data construction and analysis processes as dynamic stages that coexist in their continuous interaction and transformation (Tateo & Marsico, 2014; Valsiner, 2017).

The cultural psychology of creativity has been discussing methodological alternatives that take into account systemic, dynamic and integrated perspectives on human development, along with the subject's undeniable capacity for action, which can modify his or her developmental pathways and challenge predictable outcomes (Glăveanu, 2010, 2015). To look at a phenomenon as a developing and moving reality means to assume the existence of a new dimension involved in psychological knowledge, namely unpredictability. Human developmental processes necessarily entail unpredictability, since each subject is an agent of his or her own self, and is capable of frustrating predictions by creating and innovating when it comes to his or her own construction. This fact challenges the established scientific praxis, which has been committed for a long time to the possibility of predicting events. However, beyond these issues, other facts also deserve the attention of researchers. For example, the interactive processes taking place between researchers and research subjects, which belong to the stage of data construction and get mixed in such way that they mutually influence and affect each other, just like in all other human encounters. The potential for human encounters is also marked by unpredictability and as such, it demands from researchers an adequate interpretation of the stages of data construction and analysis as an organic, integrated process. The interactions that take place in any research that works with human beings, in addition to the psychological experiences of the subjects involved, modify both the structure and the dynamics of data construction. We need methodological tools capable of capturing, comprehending, questioning, describing and analyzing the vast array of knowledge that is available at the moment of data construction and analysis before converting such data into new knowledge.

Research on creativity has not traditionally favored qualitative studies. In mainstream creativity research, quantitative studies predominate, but some changes have been observed in this regard. Some researchers have been promoting over the last decade new methodological choices and opening space

for qualitative research in creativity (Gralewski, 2016; Neves-Pereira, 2004; Neves-Pereira & Branco, 2015; Palega, 2015; Rojas-Drummond, Albarrán, & Littleton, 2008; Yokochi & Okada, 2005). Despite these obstacles, sociogenetic theories and models have gained strength and a significant number of researchers and theoreticians have emerged in this new field. This movement tends not only to strengthen a new conception of creativity, but also to increase the written production and research in this area. The cultural psychology of creativity situates itself in this gap, in search of its due space.

Creativity Investigated as a Developmental and Change Process: Introducing Microgenetic Analysis

The cultural psychology of creativity emerged from the field of sociogenetic approaches with an original theoretical proposal regarding the development of creativity (Glăveanu, 2015, 2016; Glăveanu, Gillespie, & Valsiner, 2015). Recognized as a social and cultural approach to creativity, this model uses its pragmatist, dialogic, semiotic, sociohistorical, and cultural influences to redraw the creative phenomenon in its conceptual, descriptive, and dynamic dimensions. According to this theoretical conception, creativity is a phenomenon with social, relational and dialogical origins, distributed among distinct instances, which include: (a) a psychological dimension, represented by the individual and the others (considering one's relations of otherness); (b) a semiotic and material dimension, which aggregates artifacts like objects and ideas; (c) a social dimension, representing the cultural "places" (contexts) occupied by subjects; and (d) the temporal dimension, which includes both historical time and chronological time (Glăveanu, 2014; Neves-Pereira, in press). Cultural psychology conceives creativity as a common and daily phenomenon arising in the relation between individuals, having a collective and distributed nature. For Glaveanu & Neves-Pereira (in press):

> To create means to act in and on the world, in ways that generate meaningful novelties and transform the person who creates and his or her context in ways appreciated as "creative" by other persons involved (p. x).

From a cultural perspective, creativity is linked to ontogeny or the development of the person (Neves-Pereira & Branco, 2015). A critical and context-based view of phenomena try to understand a subject and his or her creative acts as acts of human development. Individuals create during their process of

becoming subjects of a culture, in the course of their lives, mediated by their experiences, emotions and meaning making processes. By considering ontogeny in the study of creativity, it's possible to avoid the separation between a subject and his or her social existence, which ceases to be understood as a backdrop for one's process and takes up a constitutive role both for the individual in development and his or her acts – considered either as creative or not creative. Creativity is a non-individualized social phenomenon, which considers the creative agent and the other individuals with whom he or she interacts as co-authors of the products and/or ideas that emerge from his or her creative efforts. The emergence of creativity requires at once a subject, his or her peers, their dialogues and relations with otherness, artifacts and material resources, as well as various sociocultural contexts (all constitutive elements of developing subjects) and the insertion of all these instances in real space and chronological time. The expression of creativity is always something original, but its existence derives from some regular movements and dynamics that can be explored, analyzed and interpreted. As Neves-Pereira (in press) argues:

> If a subject is constituted in a culture then creativity originates from this living, tense, unpredictable encounter. The cultural psychology of creativity seeks the origins and the developmental processes of this phenomenon in people's daily actions and in socio-cultural contexts, which generate the new, novel or surprising events we call creative. This process is not located in persons, trends, places or socio-cultural settings. Instead, it is distributed among these instances, starting from the interactive or dialogical movements that give rise to a creative act (pp. 20–21).

Research on creativity will then be organized according to the epistemological and theoretical foundations that guide each researcher. This is valid for all theoretical approaches in this field, assuming that the ways of constructing and analyzing data will be different, in order to serve distinct conceptions of ontogeny and views of creativity as a phenomenon. Beyond theoretical differences, which define the positions of researches in distinct arenas, the production of knowledge is not a neutral practice. On the contrary, it is inevitably permeated by the values, beliefs and philosophical, ideological and the theoretical orientations of each researcher, of his or her researched subjects, and of the other participants within the scientific enterprise. Many questions affect a researcher's decision-making process at the moment of planning a research project. Some aspects are more "dominant" at this moment, proposing both explicit and implicit dialogues to be listened to and complied with based on each researcher's personal characteristics, such as one's critical view of science.

In the scientific field, there are some critical researchers and other scholars who use the toolkit of established and validated methods in their investigations, as Sato et al. (2007) have highlighted. There is nothing wrong with their viewpoint, which is dominant in psychology today, but it does not provide answers to the questions posed by sociocultural traditions such as the cultural psychology of creativity. A more authorial process of data construction and assessment is necessary in order to account for a phenomenon as complex and as determined by a multiplicity of factors such as creativity.

Microogenesis and Creativity: Investigative Possibilities

The microgenetic model has been used in psychology by numerous researchers interested in the genesis of psychological processes, such as Piaget, Bruner, Vygotsky, Luria and Leontiev (Garvey, 2014). The first references to the expressions *microgenesis* and *microgenetic study* were found in the work of Werner (1956), an Austrian psychologist, later settled in the USA, who investigated themes such as perception, aesthetics and developmental processes in children with regular psychological functions vis-à-vis children with slow mental development (Rosenthal, 2006). Werner was interested in investigating the structure and dynamic of subjects' immediate temporal experiences at the micro and genetic level in a laboratory setting. By introducing the psychological experience in micro moments, Werner sought to understand it based on temporal scales and tables that allow observing development processes in discrete movement (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2008).

In his texts on methods, Vygotsky (2004) already pointed to the relevance of associating a micro with a macro-analysis for unpacking the socio-historical and cultural context of development. The micro-dimension captures development processes in formation, which can only be understood in light of meanings and feelings shared among persons and their contexts, by means of actions, dialogues, communication and inter-subjective semiotic mediation processes. For sociogenetic approaches, microgenesis is inseparable from the socio-historical matrix and serves as a methodology precisely because it considers the conceptual dimensions highly prized by this theoretical model, such as: (1) the social construction of higher psychological functions; (2) predominantly mediated human interactions; (3) human development as a complex, systemic, bi-directional, dialectical and dialogical process; and (4) an emphasis on social interactions.

The cultural psychology of creativity is a model that follows a social, historical and cultural matrix. Therefore, it shares the Vygotskyan premises that represent the constitutive pillars of sociogenetic models. The analysis of creativity as a phenomenon distributed along human, social, material and temporal instances is better grasped by methodologies that access the movements, transformations and changes of human developmental processes. The study of a phenomenon's microgenesis allows analyzing the development process of creativity precisely because it does not move away from the sociogenetic view of the subject, and because it considers that theory and methods are interdependent instances, which require a minimum level of congruence (Góes, 2000). Since this chapter investigates the relevance of microgenesis for creativity studies, it is necessary to define this method and how it has been used in research. At present, microgenesis is stepping beyond the limits of laboratories and boldly projecting itself toward the most diverse fields of data construction.

Microgenetic analysis is a qualitative knowledge-construction method aiming primarily at exploring the processes that underpin psychological phenomena by means of a micro-outlook, and focusing on the details of the episodes that mark a given human experience. As we microgenetically analyze a phenomenon, we capture the stream of its occurrence by video recordings, deep interviews and/or on-site observations, and divide it into interactive episodes that allow us to analyze the actions of an individual subject or focal group, in addition to the ongoing interactions, inter-subjective processes, conditions and socio-cultural events which are unique to the context of the analysis, the ways of expression of the subjects involved at the moment of observation or record, and the time elapsed during the occurrence of the phenomenon (Neves-Pereira, 2004). Such thorough (micro) analysis allows us to identify the genesis of psychological phenomena, along with their processes of development and transformation, and possible dialectical syntheses that give rise to new behaviors. Methodologically, microgenesis allows capturing processes in development, along with the time of their occurrence, context scenarios, the historical time of the investigated phenomena, and the emergence of psychological phenomena in transformation and change (Neves-Pereira, 2004; Neves-Pereira & Branco, 2015).

In a general way, discussing microgenesis does not seem to be very complicated. The difficulties emerge as one moves from discourse to investigation, construction and analysis of research data. Investigating processes in transformation (Lavelli et al., 2008) takes researchers back to some basic questions such as:

1. How does a developmental change take place?
2. What characterizes a transformation in human development? Is there a developmental gain?
3. Which elements are involved in such changes?
4. How can new and emerging developmental forms be identified?
5. Do new developmental forms coexist with or extinguish previous ones?
6. How can the dynamics of transformation in human development be captured?

These issues precede the praxis of microgenetic researchers and preannounce the complex scenario that surrounds them in the necessity of identifying human micro-experiences by linking them to the macro-contexts that mediate human development trajectories, as Vygotsky (2004) proposed. In the case of creativity, microgenetic research seeks to identify: (a) the genesis of creative behaviors and actions (creativity always has a history in the life of every subject); (b) the ways of expressing such creativity, as identified in the contexts of human development under analysis; and (c) possible transformations in the creative actions of subjects as consequences of a given intervention that seeks to generate something new. Differently from longitudinal studies, which compare products of development in the course of time, microgenesis strives to account for processes, that is, for what takes place in an irreversible time, with an evolving subject.

Lavelli et al. (2008) point to some elements that allow discerning a pathway of development for microgenesis:

Moment 1: Microgenesis is an idiographic methodology. Its analyses are focused on processes of developmental change involving individual subjects, dyads, triads or small groups. Its focus of analysis is always a subject with another subject in an interaction.

Moment 2: Microgenetic studies are focused on the experiences and/or situations of subjects in social interactions, with the aim of apprehending developmental changes, that is, human development processes as they emerge and transform. These processes are analyzed before, during and after their emergence and transformation. Microgenesis is concerned with what happens with a subject before, during and after a particular life situation (an activity, in interaction with the other, and so on).

Moment 3: Taking a deep look at interactive episodes generates an enormous quantity of data. Such data, in turn, leads to dense and complex analyses that often need to be supported by other

data-construction methods, such as naturalistic observations, interviews or focal groups, in order to be understood. Microgenetic studies result in a vast wealth of data and count on the willingness and talent of the researchers capable of interpreting them.

Moment 4: Interpreting microgenetic data demands knowledge and skill from researchers, for instance their theoretical and methodological proficiency in the field under investigation. An exhaustive analysis of the data can generally lead to imprecise results. In such circumstances, it is important to rely on peer support.

Studies that investigate creativity using microgenesis are not yet usual in psychology. In general, microgenesis has been used to investigate themes in connection to human development, learning, subjectivation and meaning making processes, the development of language, perception and cognitive development, among others (Gralewski, 2016; Palega, 2015; Yokochi & Okada, 2005). When the object under study is creativity, researchers have prioritized other modalities of analysis, in particular, case studies, discourse analysis and even contents analysis. Brazilian authors such as Alessandrini (2003) and Neves-Pereira (2004) developed studies associating microgenesis to the analysis of creative processes in different contexts. In other countries, researchers such as Glicksohn & Yonai (2010), Rojas-Drummond et al. (2008) and Sullivan (2011) sought to use microgenetic analysis as a methodological resource in their studies. Although still marginal, microgenesis has been gaining ground in creativity research.

In Brazil, Neves-Pereira (2004) developed a microgenetic study investigating the development and expression of the creativity in a classroom context. One of the aims of this investigation was to analyze social interactions and educational practices linked to the encouragement or inhibition of creativity among teachers and students aged 5–6 years old in different Early Childhood Education settings in the city of Brasilia, Brazil. The results of the microgenetic analysis carried out in one of the investigated schools will be discussed below by presenting a narrative that articulates microgenetic episodes in order to identify changes and transformations emerging from the processes and interactions experienced by the participants. There are relational situations in which no significant developmental changes take place, and interactions that do not construct new developmental features – which, unfortunately, is a common reality in schools. The microgenetically analyzed social and pedagogical interactions took place during a session conducted by an Early Childhood Education teacher in the context of a lesson with the specific aim

of developing creativity among her students. This activity was requested by the researcher and prepared in advance by the teacher. The sessions were recorded in video format.

The school where the session was held adopted a traditional pedagogical model with little space for innovation in its educational practices. However, this school did not perceive itself as a representative of traditional pedagogy – quite the contrary. Although it was not capable of explaining which theoretical models guided its practices, the institution valued its creative capacity and, according to its Director, it had some very creative teachers. The teacher who participated in the study, henceforth PA, was pointed out by the school direction as the most creative teacher of the institution. PA accepted the researcher's request and developed an activity aimed at promoting creativity in the classroom, entitled "***The dog made from folding"*** ["***O cachorro feito com dobradura***"]. 16 children participated in this task, including 10 girls and 6 boys. This task was divided into 24 episodes, which were microgenetically analyzed. The proposed activity was not new for the students. Despite the researcher's request to construct an original activity capable of encouraging creativity in the classroom, the teacher insisted in performing a task already known by the students. The teacher's views on how to develop creativity among her students was limited to proposing exercises that somehow explored motor and/or artistic skills. According to PA, this was the cue for the emergence of creativity in the classroom, even though the task's repetition was part of the process. Some selected episodes show PA's interactive process with the children indicate, paradoxically, the inhibition of the students' creative potential (see Table 10.1).

The possibility of analyzing the micro-moments of interactions between this teacher and her students in this activity showed how the developmental process of creativity was prevented in this particular educational context, despite the fact that the task was planned and applied by the teacher with the aim of developing her students' creative potential. The teacher's actions, beliefs and values drove her students towards individualistic – instead of cooperative – behaviors, repetitive actions, inexplicable prohibitions, conformism and obedience to rules, among other aspects that clearly inhibited free expression among the children, and, consequently, the emergence of creative acts (Glăveanu, 2015). Even in situations of defiance of the teacher's rules, it was difficult for the students to maintain motivation for the task. The most frequently observed attitude was discontinuing the activity (seven from the total 16 students gave up finishing the task). The activity proposed by the teacher inhibited the creative expression of the children, and she did not notice it, since she believed that the task was quite adequate to promote creativity.

Table 10.1 PA' Structured activity: The dog made from folding

Initial narrative: **The students are quite motivated to execute the task named "The dog made from folding". Their initial motivation was recorded by the involvement of the children with the teacher's proposed activity, as episode 6 indicates. PA presented it to the students during the *"rodinha"*, i.e., the moment when the children sit together in a circle to talk about diverse themes**		
Episode	Episode data	Episode analysis
6 ***Who has a dog here***? (00:43 sec.)	PA asked the students about who had a dog at home. Some of their answers were: PA said: *Who has a dog…. Who has a tiny dog, a small dog? Raise your hands!* Four children raised their hands as a sign that they had a dog. One boy said: *I have both!* PA continued: *And who has that really big one?* Six children raised their hands as a sign that they had a dog, shouting: *I! I! I!* PA said: *Ah… The tiny one, the tiny doggies, how do they bark?* The children started to imitate small dogs barking with high-pitched voice. One boy said: *Oh teacher!* PA said: *What's up, Pedro Aurélio?* And she did not heed the boy's call. The children continued barking as small dogs supposedly bark PA said: *What about the big dog, what is it like?* The children immediately started to imitate how large dogs supposedly bark with low-pitched tone. PA observed the scene PA continued: *Now each of you…. each of you will have to imitate your dog, no matter if it is tiny or big… however it is….!* The children began imitating dogs with different barking ways and moving around the classroom. PA watched the entire scene, clapping her hands and standing up: *Now everybody, c'mon, imitate little dogs around the room.* PA walked away from the circles, leaving the children behind	PA introduced the activity's theme, motivated the children to speak about their little dogs, did not allow all of them to speak, did not listen to the students who fought each other to speak about their dogs, and left the circle to prepare a ready-made folding activity for the children. The paper sheets handed out by PA to the children had been previously folded. The sheets, with the undone folding, were handed out to the students with the marks of where the folding should be made for the second time. The children did not have the option of folding the little dog differently. By the end of the activity, all children had identical dogs differentiated only according to the color of their painting. From the beginning of the task, it is possible to identify the flow of action and interaction of the teacher with the children, resulting in a process in which creativity, as a human function, is summarily ignored in the task. The episodes show PA acting in the opposite direction, that is, inhibiting creative action among the children and favoring the technique of the proposed task, as the episodes below show

(*continued*)

Table 10.1 (continued)

9 "***Making the little dog***", (00:17 sec.)	While still seated in the children's circle, PA said: *Now you will… hmm… make your little dog, ok? (…) But you won't pick up the little paper to draw. Have you learned to make dog-folds?* A girl said: *I can make it already!*	The downplay of creativity as part of the task is expressed through PA's words as she announces the activity and reminds the children that they have performed this task before. The children follow the interactive flow and reply that they already know how to make the little dog. The task was previously defined
Continuing the narrative: **At the moment when PA presents the actual activity to the children, their initial motivation disappears. The activity had been already performed by the students in previous situations. PA walks from the children's circle to the small classroom tables. From this moment on, some children no longer pay attention to the proposed task, which was already known. The low level of motivation and the attitude of quitting the task among some students are perceptible. Any possibility of developing creative actions is inhibited at this point**		
15 "***The little dog's body***" (00:56 sec.)	PA hands out the second paper sheet with the folding marks to the children. This paper sheet was the little dog's body. The children immediately reply: The second girl to whom PA hand out folding #2 said: *But it's just the same thing!* Another girl, who just received her paper sheet, said: *Teacher, I will do it right away!* PA replied to the first question saying: *Yes, this one is just the same as the one we did before*	There is nothing new in relation to this task in the dialogues and interactions between the teacher and the children. The task is already known, the children execute their activities mechanically and motivation is evident only in side-dialogues about each child's dogs. The task was separated from the experience of having a dog, practiced by many children in the group. Not only creativity was left out of the scope of this activity, but also the dissociation between pedagogical practice and real life became visible

(*continued*)

Table 10.1 (continued)

Continuing the narrative: **Halfway through the task, classroom interactions between the children and the teacher remained unchanged. Nothing new emerges and there are neitherbehavioral changes, nor questions by the students or the teacher about the task. They all know how to carry out the task, while work continues in a mechanical way**		
18 "***Painting without a pen***" (01:13 sec.)	PA approached a table where a girl was picking up a water color pen from her case. The girl was probably picking up this color pen to paint her dog. PA immediately reacted and said to her: *No color pen, all right?* The girl returned the pen to the case without making comments. PA continued walking around the tables and hurried up the children's work PA continued walking around the classroom. She suddenly said aloud: *No color pen! Do we use color pens in Kindergarten 2?* In Kindergarten 2 classroom, pens are not allowed. The reason behind this prohibition was not explained to the children or to the researcher. The children can only use color pencils and crayons	PA establishes inhibiting rules for any creative process. The first rule was: Kindergarten 2 children cannot use color pens to draw, but they can have these pens and take them to school. There is no obvious logic in this prohibition
Continuing the narrative: **PA introduces a hindrance regarding the use of painting material. She does not allow the children to use water color pens to pain their dogs. Yet, these pens are still part of the school items taken by the children to their classroom. The painting of the little dogs can only be done with color pencils or crayons. Inhibiting the use of painting material in an activity that requires this task with the objective of developing creativity is not only a contradiction, but a way of hindering the visual expression of children. As they are prevented from using their pens, many children follow the teacher's orders (this situation must be common in the classroom), demonstrating conformism. A boy breaks the rule and paints his dog with a color pen. However, he does not seem to be truly satisfied at acting against the teacher's order. One may suppose that a school environment where children are restricted in relation to the use of their own painting and drawing materials cannot effectively mediate the development of creativity**		

(*continued*)

Table 10.1 (continued)

19 ***Don't help [each other]*** (03:17 sec.)	[PA had said: *No color pens! Do we use color pens in Kindergarten 2?* The children replied: *No!* PA asked again: *Do we use color pens in Kindergarten 2?* The children replied again: *No!* PA continued: *Ah… do we do our classmate's work?* The children replied, less emphatically: *No!* PA continued: *Ah… we do our own work, right? Our classmate does his own work. So, let's go!* A girl said: *But what if we want to… but teacher, what if we want to do something for a classmate, can't we?* PA did not answer the girl as she was already standing by another table, located quite far from this child	Not only was the use of materials prevented, but also cooperation. PA understands that creating as an individual act, and to help a classmate is something that should not be encouraged in class. Despite her individualistic orientation in the classroom, some children broke this rule and collaborated with their peers An interesting event occurred during this episode: a very significant dialogue took place at the table around which Pedro Aurélio, Luciano and Júlia were sitting. Julia asked Luciano to see the back of his little dog. Luciano replied that one could not see its back, because a dog had no "back". In fact, the dog's back was explored neither by PA nor by the children, as if it did not exist. It remained blank without being painted or drawn on. For Luciano, therefore, the dog had no backside, because this space was not considered
Closing of the narrative: **The teacher oriented her students in the classroom not to help each other perform their tasks. This individualistic orientation leads to the construction of similar values, as it assumes that creativity is an individual act in which there is no need for cooperation, and determines the nature of interactions in class. Some children break the teacher's rules and negotiate new cooperation forms with their peers. In this episode, such break emerges in the words of the child that says: *But what if we want to… but teacher, what if we want to do something for a classmate, can't we?*** **A side-conversation among three children made an interesting moment during the task, which could be explored by the teacher. The children questioned why the dog remained blank (i.e., without painting) on the back of the paper sheet. One of the children said that the "dog has no back". The teacher hears the dialogue, laughs and walks away from this group. The possibilities of developmental gains in terms of creativity, which emerged from the children themselves, were not harnessed by the teacher** **In this task, the teacher's actions in the sense of inhibiting the creative expression of the children predominated over actions with a potential to promote creativity**		

Therefore, it is possible to conclude that teachers' beliefs, values and knowledge are powerful mediators of developmental processes in the classroom (Neves-Pereira, 2004; Neves-Pereira & Branco, 2015). But are the teachers themselves aware of this extremely relevant fact?

As one analyzes the interactive episodes between PA and her students, it can be seen that time and again her interventions hindered the emergence of creativity in the context of her observed class activities. Microgenetic investigation allows an in-depth analysis of the developmental trajectories of small groups under observation. In the case of **episode 6**, the effects of PA's behavior on the children can be noticed at a micro time scale from the outset of the activity. In their little circle, the children are encouraged to undertake the proposed activity but, soon after, they begin to lose motivation, since PA can neither hear them, nor let them talk among themselves, as she distances herself from them. In the video footage, demotivation becomes noticeable among the children in their circle. As PA takes distance, they change their topic of conversation, cease to look for her and continue to imitate puppies in some mutual interactions (new, parallel games emerge among them). An immediate progress-and-retrocession movement takes place in the students' motivation to continue executing their task, and also in terms of the possible creative actions or practices that could be developed among them. Nothing new emerges in their repertoire of behaviors and expressions. The proposed activity did not have the expected effect.

The fact that the task had been already carried out twice by the children in class definitely dampened their motivation. PA proposed a task that the children already knew. What type of reflection could generate a proposal of developing creativity by resorting to a repeated activity already known by the children? The dissonance that was present in PA's proposal led the children to behaviors such as demotivation, lack of interest, disengagement from the task, a mechanical execution of the activity and, more interestingly, the construction of parallel playful activities. The video footage clearly shows some children organizing new activities in parallel to PA's proposed task. For instance, two children playfully started exchanging color pencils among themselves as a game in **episode 9**.

If human development processes, from a socio-cultural perspective, take place via semiotic mediations that express themselves in the social interactions among the subjects who inhabit certain socio-cultural contexts, then it is possible to notice how PA is not successful in her task of promoting creativity in this activity. The precise opposite occurs. Her interactive proposals seem destined to prevent any creative, innovative or different action from emerging among the children both during and after the activity. In all analyzed episodes,

at no point was any developmental transformation in connection with creativity identified among the children who participated in the puppy task.

Thus, a microgenetic analysis allowed grasping the reasons that led PA not to attain her objectives of developing creativity among her students, and to end up acting – without noticing it – in the opposite direction. The analysis of these micro-episodes showed she was considered the school's "most creative" teacher because her students – using pencils and crayons, whereas color pens were prohibited – produced many drawings that were used to decorate the school. PA' students did draw frequently, although they had to follow the rules imposed by her. According to PA, she did not have any personal involvement in their artistic and visual activities, since she did not draw and did not like to perform this activity. Her personal desire, in turn, was entirely focused on a Biology course she was intending to take in the near future. The sociocultural contexts experienced by PA did not seem to include creativity as a value or as a practice, and this fact directly affected her understanding of creativity. PA expressed a very limited comprehension of this concept and did not have a notion of how to work with her students toward developing their creative expressions, despite being convinced that she mastered the theme. It was for this reason that she was selected to participate in the study. PA's lack of reflections on herself, her competences and knowledge compromised her work in regard to creativity. In this case, the developmental dynamic of the creative process was impaired.

Microgenetic studies are a valuable resource for psychological research and, in particular, for the study of creativity. A microgenetic analysis of the progression of interactive processes aimed at developing human creative expression, while witnessing the diverging pathways that emerge from experiences as the one described above, lead us to all types of concerns. In general terms, researchers and educators cannot cease to challenge the current conditions of teaching training processes, the preparedness of schools to develop human potentials and, particularly, the huge difficulties on the path of developing creative possibilities among children and adolescents. This chapter seeks to sensitize not only the academic community, but also education professionals so they may invest more in microgenetic researches and in preparing schools to be active sites for the development of human creativity.

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11

Studying Creativity as a Social Process: The Use of Subjective Cameras

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There are many methodological options available for creativity researchers. They range from the use of questionnaires and tests (e.g., Torrance Tests of Creative Thinking, see Torrance, Ball, & Safter, 2003; Evaluation of Potential Creativity, see Lubart, Besançon, & Barbot, 2011; Kaufman Domains of Creativity Scale, see Kaufman, 2012), focused primarily on the creative potential or performance of individuals, up to methods like historiometry (Simonton, 1990: Simonton, this volume) and the consensual assessment technique (Hennessey & Amabile, 1999; Baer & Kaufman, this volume), trying to explore creativity within its social context. Nevertheless, none of the methods above breaks from its focus on individuals and their products. Even if they all use a comparative logic (in the end, individual scores need to be compared to an average of sorts) and aggregate scores, the "unit of analysis" remains firmly grounded within the person. This begs the question, fundamental for the present Handbook, of how do we study creativity as a social *and* psychological phenomenon rather than an exclusively psychological one. In other words, are there any methods that explicitly study creativity as a social process?

This chapter will illustrate one of these methods: the use of subjective cameras to capture the person's perspective within an activity system (Lahlou, 2011; Lahlou, Le Bellu, & Boesen-Mariani, 2015). Subjective cameras (or subcams) are small devices used to record the person's activity both video and

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audio. The difference from "normal" cameras, placed typically beside the person, and capturing him/her and the context, is that subcams are worn by the participants near eye level. In this way, they offer a glimpse into more than what the person did but what he or she saw and heard while acting. While not as specific as eye-tracking devices (and, in many ways, more freeing and less intrusive), a subjective camera provides researchers with a recording of the experiential flow of activity. Their biggest advantage is that they capture this flow without disturbing the person wearing them with questions about what he or she thinks or feels, something typical for think-aloud protocols (Jääskeläinen, 2010). Being able to view again the performance from this unique vantage point, the participant can re-situate him or herself within the flow of activity at a later stage and recover one's train of thought at specific moments.

Until now, there have been few studies using the subcam technology, most of them within work contexts (e.g., Le Bellu, Lahlou, Nosulenko, & Samoylenko, 2016), where this method is useful to unpack expert performance and train novices. Other, more original uses, include documenting the work of policeman (Rieken, 2013) or common, everyday moments such as coming home (Cordelois, 2010). The use of subjective cameras in creativity research has been advocated for in the past (Glăveanu & Lahlou, 2012). It includes until now mainly an exploration of artistic and craft practices (Glăveanu, 2013, 2015) as well as, more recently, dyadic interactions within a creative task (Glăveanu, Gillespie & Karwowski, 2018). In all these instances, subcams allow for a close analysis of the activity system, without disturbing the creative process, particularly suitable for small objects that would be difficult to observe otherwise (e.g., the decoration of Easter eggs). Most of all, this technology enables a detailed documentation of the microgenesis or moment to moment emergence of novelty.

However, as I will argue in this chapter, there is much more to the potential of subjective cameras for creativity research and, in particular, social creativity research. This is because, beyond using an interesting technological gadget, the methodology underpinning subcam research is intrinsically social and necessarily grounded in the notions of position(ing), perspective (taking), and reflexivity. I will start by briefly showing how this new "vocabulary" contributes to a radical critique of individualistic theories within creativity studies. Then the methodological guidelines for using subjective cameras in creativity research will be offered, based on existing studies. The chapter will end with reflections regarding the relation between theory and method within the field of social creativity.

Perspectival Creativity

It has long been recognised that creativity is, at least in part, social. Even if most researchers continue to study the correlation or causal relation between mainly intra-psychological variables (e.g., types of thinking, motivation, personality traits, intelligence) within creativity, systemic (Csikszentmihalyi, 1999), multivariate (Lubart, 2003), componential (Amabile, 1983) and propulsion models (Sternberg, 1999) all "make room" for a social element. This ranges from the social environment, in a multivariate approach, to the impact of feedback, rewards and social presence in componential studies, and up to a more general view in which high-level creativity depends on the appreciation of others and its reception within society (in systemic and propulsion-based research). While the latter contribute more to "socialising" creativity than the former, the critique remains that they all operate with the implicit assumption that the individual and social are different – even if they interact – and they need to be studied as such. The premise of interdependence between individual and social within creative action is specific for the cultural or sociocultural approaches that have been popularised in recent years within creativity studies (e.g., Glăveanu, Gillespie, & Valsiner, 2015). For these approaches, creativity is already social, even when it is expressed by individuals working in isolation. How can this be the case?

Because, from a sociocultural perspective, to create means to reposition yourself in relation to the problem or issue at hand, develop new perspectives on it, and place these perspectives in a reflexive dialogue with each other (Glăveanu, 2015). The origin and dynamic of these positions and perspectives is deeply social since they are all grounded in the experience of different roles and identities afforded by living in a human society. Since early childhood, during play episodes, children learn to play different parts (e.g., parent and child, doctor and patient, hider and seeker, and so on) and, most importantly, to switch between them. This kind of position exchange (Gillespie & Martin, 2014) is fundamental for developing an agentic self and for later acts of creativity. In time, these positions and the perspectives associated with them get to be experienced in a more symbolic or imaginative manner. For instance, it is no longer required for the person to dress up or pretend he or she is a doctor in order to approximate a doctor's perspective in a certain situation. It is precisely our ability to understand, formulate, and move between perspectives that is at the root of creativity. And this is why creativity itself is intrinsically perspectival or social in nature. Explicitly social episodes of creating, such as working in groups or teams, accelerate this dynamic by making the perspectives

of others available through dialogue. However, working in solitude is equally social because our minds are, themselves, dialogical and interconnected with the minds of others (Bakhtin, 2010).

The perspectival underpinning of creativity is highlighted also by traditional concepts in the field such as divergent thinking (Runco & Acar, 2012), bisociation (Koestler, 1964), conceptual combination (Ward, 2001), and so on. The issue with all these, essentially combinatorial models of creating, is that they consider "ideas" as individual and district pieces of information processed by our cognitive apparatus. In reality, these ideas are best understood as perspectives, whose emergence, differentiation and combination is impacted by society and culture. This is not to say that there are no individuals (or individual minds) doing the creating. But these individuals and their minds do so in relation to other individuals and with other minds. In this sense, perspectival creativity is, at once, a relational and dynamic phenomenon. It is relational inasmuch as it focuses our attention on communication and interaction rather than internal, mental processes, and dynamic in its view of how acts of communication are internalised by the person, appropriated in a unique manner, and then externalised or made available for others as part of a continuous cycle (Vygotsky, 2004). In this way, a social approach to creativity doesn't deny individual distinctiveness but, on the contrary, underlines it by pointing to the fact that each person is situated at unique intersections within dynamic social networks and, as such, he or she comes to encompass a complex diversity of positions and possible dialogues between them. Paradoxically, it is by sharing with others and participating within society that we become more unique and more (potentially) creative as individuals.

Capturing Perspectives: A Methodology

The social approach to creativity outlined above might be something even researchers working within other paradigms could agree with. Yes, there is a social root to our ideas and we do take the perspectives of others while creating. But how do we manage to reveal this at a methodological level? The dangers of methodological reductionism (Montuori & Purser, 1995) are alive and well in a field that aims for "parsimonious models" of creativity (Runco, 2009). If we want to reduce creativity to something measurable and simplify its process, then it makes sense to look at products alone and assume creativity is all about ideation. As researchers committed to a social and cultural approach, however, we have a methodological challenge to overcome and, potentially, a contribution to make here.

What does a perspective look like? Given the fact that we connect to the world through our bodies, senses, social roles and cultural heritage in a multiplicity of ways, the notion of perspective depends on what positions they are formulated from. In essence, a perspective relates a certain position with a certain aspect of reality (see Gillespie, 2005; Martin, 2006); it becomes a meta-perspective when that aspect of reality is the perspective itself. We are constantly positioned in the world in a variety of ways. We occupy at all times certain physical positions and, from then, we develop unique visual perspectives. For instance, within a classroom, the visual perspective of the teacher and that of the students will necessarily be different given where they stand in the room. Moreover, each and every student will arguably develop unique visual perspectives as no two people occupy the exact same physical space. For creativity researchers it becomes interesting, starting from this embodied aspect of positioning, to understand how changes of position might lead to changes of perspectives and, potentially, to creative outcomes. Would a teacher seeing the class from the (visual) perspective of a student be able to generate new and useful ideas about how he or she should be teaching? What becomes apparent in this example is not only the fact that repositioning is closely related to creativity, but also that positions are "layered". They are physical, psychological and social at the same time. Going back to the situation of the teacher, he or she does occupy a certain position in space, but he or she does so precisely because of playing a certain social role and adopting the psychological mindset that goes with it. Trying to occupy the position of students thus, and hence trying to take their perspectives, involves much more than moving around physically (although this might be a start). It requires an articulated psycho-social-material movement. Luckily, this kind of phenomena are extremely common in our daily lives to the point that we are rarely even aware of them. We try to think from the perspective of others, exchange positions, and experience different social roles. In the end, this is what a lot of our activities, from reading to watching movies or going to the theatre, allow us to do.

The question is how to capture these perspectives in ways that make them amenable for analysis. The subjective camera mentioned before offers us a simple but efficient solution. When wearing a subcam, we are effectively recording the embodied dimensions of a position: what people hear, see and react to while performing their activity. Using this recording to then discuss the activity with the participant gives us the opportunity to go beyond the physical and explore the psycho-social aspects of a situation. Bodily movements betray intentions and thoughts, exchanges reveal goals, surprises show when our action might have gotten off course. The chance to review a subcam recording with the person who wore it represents, methodologically, an

occasion to go from behaviour to mental states and from positions in the world to the perspectives they make possible. Where is the social, interactive element here? Well, very often the activity being studied is performed together with others. But this, as discussed before, is not the only or even most important marker of sociality. In fact, by being in dialogue with the participant over different perspectives existing within the situation, the method cultivates reflexivity or the capacity to develop new perspectives on the self and on one's course of action.

In summary, the use of subjective cameras as part of what Lahlou (2011) called "subjective evidence-based ethnographies" (SEBE), requires the following three steps:

1. *Recording the experience with the help of a subcam*. It is important here not only to have the permission of the participant but also to give him or her the freedom to choose what of the material will be given to the researcher. This underlines the ethical dimension of research and it also makes it easier for participants to "forget" they are wearing a subcam by increasing their sense of control.
2. *Interviewing based on the recording*. Usually, before the interview, the researcher watches the material collected in light of his or her research questions and selects relevant fragments. These fragments, or sometimes the whole material, are then reviewed by researcher and participant with the latter being asked about the thoughts, intentions and emotions at the moment of acting.
3. *Creating an intersubjective account of the experience*. This final step integrates the interpretations of the researcher and the information from the participants within a coherent (intersubjective) account of the (subjective) experience of the activity, based on the (objectivity of the) subcam recording.

There are, of course, possible variations to these three steps as they are not meant to be prescriptive. Different research projects, particularly in the field of creativity, might have a specific focus. For some, doing a quantitative count of instances of a certain behaviour as reflected in the recording might be sufficient. For others, the real data will be represented by the interview with the participant with the subcam record as merely a prompt for the discussion. But, independent of research focus, researchers would be advised to recognize and examine subjective camera material for what it is: access to the person's own perspective. This issue has been fully valorised only recently (see a brief analysis of artistic creativity in Glăveanu, 2015). But its

possibilities for unpacking perspectival or social creativity are noteworthy. To recapitulate the three phases mentioned before, each one of them highlights a certain aspect of the social process:

1. *Accessing a perspective*. Subcams offer researchers access to a "first person perspective" within an activity system. They do so by following the position of the participant and his or her perceptual connection to the environment and to others. This perspective, however, is subjective only inasmuch as it reflects the positioning of the subject. It lacks subjectivity though by reflecting behaviour rather than action which is meaningful, intentional behaviour. The second step turns it precisely into this.
2. *Understanding a perspective*. When interviewing the participant based on the recording, the researcher gets to understand his or her behaviour as enacting a certain perspective and, possibly, moving between different perspectives while acting. These movements are marked by interruptions and transitions within the activity cycle, by the intervention of other people or, simply, by the realisation that things can be done in a different way. Getting to understand the thoughts, motives and emotions of those who create means getting to know the positions and perspectives they are enacting.
3. *Triangulating perspectives*. In the third stage, the nature of the interview as an intersubjective exchange becomes most apparent. It is not only his or her own position and perspective at the time of action that the participant is "confronted" with as part of the research. It is also the perspective of the researcher on this action. The latter is reflected in what the researcher assumes, hypothesises or interprets based on the recording and the dialogue. The dominant characteristic of this dialogue is reflexivity in the sense that both researcher and participant get to view their perspectives and interpretations as one among many and, thus, remain open to creating new meanings within the interview.

To recapitulate, if the recording captures a (mostly) visual perspective, the interview enriches it by revealing the social, psychological and cultural layers it possesses from the start; more than this, it offers opportunities for repositioning and reflexivity within the study, something that makes subjective cameras a method that can lead to creative findings as part of the research process. When using predetermined categories of responses to do the scoring, as in the case of tests and questionnaires, or constraining people to adopt only on position (e.g., that of producers or evaluators in the consensual assessment technique), there are small chances of reaching original conclusions. In contrast, a perspectival study of creativity, the phenomenon that itself thrives

in the context of multiple perspectives, can leave both researcher and participants with new insights about the activity being examined.

To take the example of Easter egg decoration, an area that has been studied in the past (including) with the help of subjective cameras, one of the key concerns for me was to understand the perspectives being enacted by the participants, mostly women living and working in northern Romania (Glăveanu, 2013). As egg decoration is a cultural practice situated at the intersection between art, religion, folklore, and a growing craft market, it became obvious from early on that the artisans would want to adopt certain positions and not others. For instance, the position of someone who continues and even defends folk traditions, closely linked with local and national identity, was important and, as a consequence, a lot of the work was described as following the prescribed steps of decoration. At the same time, a new social position had been developing in the community ever since decorated eggs become more intensely commercialised, after the fall of Communism, and that is the position of innovators. Most respondents were proud of their own, small but personal additions to tradition and they found illustrations of these in the content or process of decoration (for examples see Glăveanu, 2010). However, it is not hard to see how these two positions, of defenders of tradition and innovators, could lead to contrasting perspectives and diverse courses of action. The use of subjective cameras and the follow-up interviews helped with much more than mapping activity in craft: it revealed it as a perspectival, reflective and ultimately creative community practice.

From Theory to Method and Back Again

The present chapter started from a consideration of creativity as a social phenomenon and raised the question of how can this social nature be reflected in the methodologies we use to study creative people and processes. The subjective camera and, more broadly, subjective evidence-based ethnographies (Lahlou, 2011; Glăveanu & Lahlou, 2012), were proposed as a key method to access the positions, perspectives and the reflective dynamic of creative action in real-life settings. This alignment between theoretical premises and methodological procedures is highly encouraged in creativity studies which, as mentioned at the start, has often relied on a paradoxical disconnect between the two.

This is not to say that researchers focused on social creativity need to abandon "individualistic" constructs such as divergent thinking, openness to experience, intrinsic motivation, and so on. These are all relevant in their

own right. What is required though is to understand them within the broader picture of actions and interactions that make up human creativity. It is towards this goal that the use of subjective cameras can contribute the most. Even if researchers using them are not necessarily adopting the language of positions and perspectives proposed here, a subjective evidence-based ethnography is meant to shed light on the relation between what creators do and what they want, think, and feel, within concrete material, social and cultural contexts. This is not a method that can be used for all purposes. For instance, those who aim to measure creativity or conduct highly standardised experiments would probably find little used for it. However, researchers interested in examining creative practices in naturalistic settings will find it invaluable.

Which brings me to some final considerations about research agendas within creativity studies. If the perspectival model of creativity, briefly outlined in this chapter, is to be taken seriously, then a new set of questions emerges within (social) creativity research. How do creative people acquire new positions and perspectives? How are these perspectives put in dialogue with each other within creative activities? Does this depend on domain, for instance what would be the differences between perspectives adopted by artists and scientists? What is the relation between reflexivity and creativity and how can we educate one with the help of the other? What is the developmental trajectory of perspectival creativity? What is the role of material objects and of technology in opening up (or closing) new perspectives? Importantly, which positions and perspectives we choose to engage with, in our everyday life, and which do we systematically ignore or even reject? The use of subjective cameras in research could help us answer at least some of the questions above. For many, it would need to be complemented by interviews, observations and even ethnographic methods, all of which are rarely used (or valued) within creativity studies today. Admittedly, all of these methods take considerable time for both data collection and especially for data analysis. One of the biggest dangers of using subcams, for instance, is the apparent ease with which information can be collected and the fact that many hours of video can feel like a "data dungeon" (Bauer & Gaskell, 2000) later on in the process. I presented here mainly the philosophy behind the use of subjective cameras and offered some general guidelines that could be adapted to particular projects. A serious reflection for researchers interested in this method concerns how data from it can be analysed. Once more, method and theory go hand in hand and, if we want to see more social creativity research then we need to build, at the same time, a strong theoretical apparatus for it.

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Part II

Empirical Approaches to the Social in Creativity Studies

12

The Sociocultural Context of Exceptional Creativity: Historiometric Studies

Dean Keith Simonton

In my earlier chapter in this volume, I indicated how historiometric methods are uniquely suitable for studying the social psychology of exceptional creativity, that is, creative genius. This chapter is dedicated to reviewing some of the key empirical findings based on this technique. Before doing so, I must emphasize that this review will concentrate on the social aspect. Like creativity research in general, inquiries into creative genius spans many other perspectives, such as cognition, development, and personality (Damian & Simonton, 2015). Results in those three areas will only be treated to the extent that they have direct relevance to a social psychology of creativity.

That restriction in mind, the empirical literature can be broken down into three categories according to the chosen unit of analysis. First, many historiometric inquiries use the individual creator as the analytical unit, a practice most consistent with the norm for research using standard methods, such as psychometric assessments and laboratory experiments. The sole difference is that the sample includes historic geniuses instead of gifted children, college students, or contemporary creators. Second, the unit of analysis may shift to the creative product. Then the sample consists of notable inventions, discoveries, journal publications, novels, poems, plays, paintings, symphonies, operas, and the like, depending on the particular domain of creativity under investigation. The closest counterpart among mainstream research is probably

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found in experimental aesthetics in which participants make assessments of manipulated art-like stimuli (Martindale, 2007). Third, creative persons or products can be aggregated into larger cross-sectional and temporal units, such as nations and civilizations assessed across years, decades, or generations. Because psychometric instruments cannot be applied to such aggregates, nor can such aggregates be subjected to laboratory experiments, this third category of historiometric research is by far the most distinctive—and thereby obtains results unavailable any other way.

Creative Persons: Geniuses

Because historiometric research on creativity is largely conducted by psychologists, it should come as no surprise that the samples consist of individual creators who have achieved eminence in in a highly-valued creative domain (Simonton, 1999). For example, among the 301 geniuses studied by Cox (1926) were Isaac Newton, René Descartes, Miguel de Cervantes, Leonardo da Vinci, and Ludwig van Beethoven. These are persons whose credentials as creators are beyond question. Indeed, these individuals can be taken as exemplars of the highest levels of creativity that can be displayed in science, philosophy, literature, art, and music. Given these samples of creative geniuses, the researcher will most often address two fundamental questions. First, how do historic creators vary in the magnitude of their achieved eminence? Second, what are the predictors of that variation?

Achieved Eminence: Variation

It requires little argument to observe that achieved eminence in a domain is inherently a social rather than individual variable. It represents the magnitude of creative impact on others, whether creators in the same domain or, in the case of the arts, an additional impact on audiences, patrons, impresarios, connoisseurs, critics, scholars, historians, etc. Hence arises the commonplace distinction between "Big-C" and "little-c" creativity, where the former demands a broad and enduring consensus on the merits of a creator's work (Simonton, 2013; cf. Kaufman & Beghetto, 2009). Yet the designation "creative genius" is not a dichotomous, "either you have it or you don't" variable. On the contrary, even among those who have left their mark in the annals of some creative domain can differ substantially in their disciplinary and sociocultural impact. To illustrate, let us return to Newton. According to one recent historiometric

inquiry, Newton represents the most eminent scientist in history (Murray, 2003). But he was one scientist among 1,445 who made a notable creative contribution to a major domain of science. At the bottom of the eminence scale reside scientists that are most likely only known to specialists. For example, who has ever heard of John Canton, an English physicist who was about 10 years old when Newton died? Even if Canton's creativity cannot be denied—just Google his name to see why—his stature as a scientific genius undeniably stands well below that of Newton.

Because the historiometric assessment of achieved eminence originated from the same concerns as the psychometric assessment of intelligence, historiometric research has always been concerned with the reliability and validity of its measures. Yet when it comes to discussing these two psychometric properties of achieved eminence, it must be acknowledged that this question is as much substantive as methodological. If achieved eminence measures are neither reliable nor valid, then the whole subject of creative genius becomes largely meaningless. Newton and Canton then become interchangeable. Moreover, any endeavor to predict the variation in achieved eminence becomes worthless. Fortunately, appropriate tests indicate that that measures of achieved eminence more than satisfy psychometric expectations. In the first place, reliability coefficients based on multiple indicators of eminence range in the upper .80s to the middle .90s (Murray, 2003; Simonton, 1990b). Even more impressive, the consensus on the relative distinction of creative geniuses is reasonably stable across decades, even centuries (Ginsburgh & Weyers, 2014; Simonton, 1991). Although "neglected geniuses" do appear from time to time, for the most part they are too rare to upset this conspicuous transhistorical stability. Those who are most eminent in their own time tend also to be the most eminent in ours. Even the occasional exceptions to this rule suggest that posterity's decision is made relatively quickly. Gregor Mendel, Emily Dickinson, and Vincent Van Gogh may have been overlooked during their own lifetimes, but within a few decades or so they would attain the stable level eminence that distinguishes them today. The "test of time" may sometimes take some time, but once the decision is made, it's decisive.

But what about validity? Historiometric assessments of achieved eminence are best validated by showing that they exhibit the correlations that would be expected based on research findings using alternative methods (Simonton, 1990b, 2014a). For example, the achieved eminence of creators is positively correlated with general intelligence, openness to experience, subclinical psychopathology, and early exposure to "diversifying experiences" (Carson, 2014; Damian & Simonton, 2014; McCrae & Greenberg, 2014; Simonton, 2009, 2014b). In addition, a creator's achieved eminence is positively associated with lifetime productivity as well as creative precocity and longevity: The

greatest creative geniuses tend to begin early, end late, and are extremely prolific throughout their careers (Jones, Reedy, & Weinberg, 2014; Kozbelt, 2014; McKay & Kaufman, 2014). Results such as these prove that achieved eminence is not arbitrarily or randomly assigned to creative geniuses. Newton must deserve a higher place in the scientific canon than does Canton.

Achieved Eminence: Prediction

At the close of the previous section I already identified some of the predictors of the differential achieved eminence of creative geniuses. But these predictors were all personal rather than social in nature. They concerned the cognitive, developmental, and personality psychology of exceptional creativity, not the social psychology of exceptional creativity. But what about the social psychology? There's plenty of historiometric research on that, too.

As noted in the earlier methodological chapter, Francis Galton's 1869 *Hereditary Genius* can be considered the first major historiometric study of genius, creative or otherwise. Although his goal was to prove that genius was born rather than made, the data that he analyzed could easily have the opposite interpretation, favoring nurture over nature. After all, Galton's demonstration consisted in compiling family pedigrees for historic geniuses. Creative geniuses, in particular, had a high probability of having parents, siblings, grandparents, and children who were also creative in the same or similar domains. Yet when closely scrutinized, these familial relationships do not operate according to genetic laws. For instance, paternal inheritance is often much stronger than maternal inheritance, implying that creative genius would involve a sex-linked gene, which is patently absurd. Creativity cannot be inherited like color blindness. Hence, it is far more likely that the advantage of such familial connections is environmental rather than genetic (cf. Simonton, 1983b). Family pedigrees represent one particular form of social networks that support creative development as well as the later manifestation of acquired creative potential.

The latter interpretation is reinforced by historiometric research indicating that achieved eminence as a creative individual is positively associated with the prominence of non-genetic interconnections with eminent creators in the same domain (Simonton, 1984, 1992b, 1992c). These creators may entail persons from the previous generation (teachers, mentors, and predecessors), the same generation (associates, collaborators, competitors, and correspondents), and the following generation (students, disciples, and successors). Moreover, the importance of such networks holds for both the arts and sciences. The popular image of the "lone genius" is largely myth. The most

eminent creators are most likely embedded in a rich network of domain-specific interpersonal relationships of diverse kinds.

The foregoing networks represent actual interpersonal relations. Yet social psychologists agree that such influences can operate via imagined or implied relationships. And that certainly holds for the emergence of creative genius as well. Achieved eminence is positively related to a creator's admiration or emulation of distinguished creators in prior generations as well as the admirers or emulators that the creator attracts in subsequent generations (Simonton, 1977b, 1984, 1992c). Newton admitted that he stood on the shoulders of prior giants—such as Copernicus, Galileo, and Descartes—just as many great scientists in later generations stood on his shoulders. Indeed, Albert Einstein was among them! Einstein's study contained the portraits of three predecessors—Newton, Faraday, and Maxwell—to whom he felt particularly indebted. Yet he never knew any of them personally. Their influence was implied by their very presence on his study's wall.

Now that we have allowed the social environment to encompass more than just direct interpersonal relationships, it then becomes necessary to acknowledge the impact of the larger cultural, political, religious, economic, and social context. This context influences both creative development and creative productivity during the course of the career. Historiometric research has identified several such factors (Simonton, in press). For example, the differential achieved eminence of great thinkers depends on political conditions occurring during the creators' childhood and adolescence, such as the positive impact of fragmentation (the number of independent states) and the negative impact of instability (the frequency of coups d'etat, military revolts, and assassinations; Simonton, 1976d). Sometimes these contextual influences can operate as individual-situational interaction effects indicative of "being the right person at the right place at the right time." For instance, the achieved eminence of American psychologists partly depends on the degree to which their research program matches the prevailing Ortgeist of American psychology (Simonton, 1992a). The role of contextual factors will return when we treat the other two units of analysis. So suffice it to say now that the individual creative genius is not immune from the influx of the sociocultural milieu.

Creative Products: Masterworks

When the unit of analysis shifts to the product level, then the first task is to assess the differential impact of the products in the sample. For scientific products, the most common measure of impact are the number of citations

received in the professional literature (Shadish, Tolliver, Gray, & Gupta, 1995; Sinatra, Wang, Deville, Song, & Barabási, 2016). The assessment of artistic products is often more complex, however. In particular, the impact measures may include performance frequencies, frequency of inclusion in anthologies or collections, citation in lists of "best works" or "masterpieces," receipt of major awards or prizes, and the like (e.g., Kozbelt & Burger-Pianko, 2007; Simonton, 1990a). As holds for the assessment of individual-level achieved eminence, these evaluations of product-level impact exhibit impressive stability across great spans of time (e.g., Kozbelt, 2007; Simonton, 1989, 1998, 2015a). Also like achieved eminence, product impact necessarily counts as a *social* variable gauging the persuasiveness or effectiveness of a scientific or artistic communication. Such evaluations cannot exist in the absence of others making judgments about what is true or false, beautiful or ugly.

The next task, naturally, is to determine the characteristics of the product that affect the magnitude of social influence. In the case of aesthetic products, these will entail both content and style (e.g., Kozbelt & Burger-Pianko, 2007; Simonton, 1990a, 1997b, 2000). For scientific products, logical and empirical aspects will prove more important (Shadish et al., 1995; Sternberg & Gordeeva, 1996). Yet in either case such research can be considered a special case of the classic social psychological literature on the persuasiveness of communications (e.g., Hovland, Janis, & Kelley, 1953). The core difference, of course, is that the factors involved for creative products are more likely to be domain specific. What makes a great poem is not what makes a great painting, for example. The social side of creative products is seen in the fact that the larger context in which a product is conceived will influence both content and style (Cerulo, 1984; Martindale, 1990; Simonton, 1983a, 1986, 2004). To illustrate, it makes a difference whether an artistic work is created under wartime or peacetime conditions. Both the content of literature and the style of music are thus affected. Again, creators do not work in utter isolation from the larger sociocultural context.

Because the creative genius has no control over whether or not a war breaks out, it might seem that the individual is a passive recipient of situational effects. Yet that inference is not always justified. For example, the work of artists receives a measurable boost in impact when the work is created in a booming artistic center, such as Paris and New York served for modern painters (Hellmanzik, 2014). Most artists certainly have the career option of emigrating from a provincial dead spot to one of these locations to enhance their careers. They can then take full advantage of the networking influences already discussed in the previous section. The quality of their work then shows an upgrade.

One final point: Sometimes a phenomenon associated with the single creative product exhibits an inherent social nature. The best example is multiple discovery and invention where a particular creative contribution has two or more independent discoverers or inventors (Lamb & Easton, 1984). Better yet, the separate contributions may be simultaneous, or nearly so. Although this phenomenon is too complex for a full explanation here, may it suffice to say that it is impossible to explicate multiples without considering the social nature of creativity, particularly the consequences of having two or more creators independently working on the same problems within a given creative domain (Simonton, 2010). This inadvertent duplication of creative effort is most likely to happen in fields such as the natural sciences where a strong consensus exists regarding the core questions and the means to address those questions (Simonton, 2015b). Such consensus is commonplace in the natural sciences, but much less so in the social sciences, and almost nonexistent in the humanities and arts. In a sense, creativity in the physical and biological sciences operates under stronger social constraints. Artistic creativity, in comparison, is far more individualistic.

Creative Societies: Golden Ages

Both individual creators and creative products can be easily aggregated into larger temporal and cross-sectional units to address questions that cannot be answered without such aggregation. For example, to test the hypothesis that warfare depresses scientific discovery and invention, a large sample of such single contributions can be tabulated into successive years or decades, and either for modern science as a whole (Price, 1978; Simonton, 1980) or broken down by nations (Simonton, 1976a; Yuasa, 1974; cf. Borowiecki, 2014; Simonton, 1977a). A particularly powerful method is generational time-series analysis in which a large sample of creative geniuses in a given civilization are tabulated into consecutive 20-year periods (Murray, 2003; Simonton, 1975, 2017; Sorokin, 1937–1941). Each creator is assigned to that generation in which he or she attained the 40th year, the overall estimate of the acme or floruit of a creator's career (cf. Gray, 1966; Kroeber, 1944). The net result is a tabulation of the timewise fluctuations in creative activity across the course of a civilization's history.

Such generational time series by themselves reveal a very critical fact: The coming and goings of creative genius is not evenly or randomly distributed across time, but rather creators tend to cluster into periods of exceptional activity, or "golden ages," separated by periods of less distinguished activity,

or "silver ages," with frequent lapses into periods of inactivity, or "dark ages" (Murray, 2003; Simonton, 1988; Simonton & Ting, 2010). In other words, just as individuals can vary in achieved eminence, and products vary in creative impact, so can generations vary in creative activity. Of course, while one civilization may lapse into a dark age, another might experience a major golden age (Kroeber, 1944; Murray, 2003). For example, the golden age of scientific creativity in Islamic Civilization took place when scientific genius had vanished from Christian Europe (Simonton, 2017). Significantly, this temporal and spatial clustering of genius applies to both the premiere creators and the also-rans (Simonton, 1988, 1996). Indeed, the greatest creators tend to be contemporaries of their lesser, but still creative colleagues, thus enabling the domain-specific social networks discussed earlier. The lone genius is no more probable at the aggregate level than it is at the individual level.

The question then becomes: What causes this rising and falling of sociocultural creativity? Historiometric research has provided an impressive inventory of both positive and negative influences (Murray, 2003; Simonton & Ting, 2010). These factors can be grouped into two categories (Simonton, in press).

First, creative activity in a given generation is associated with various contextual variables also operating simultaneously within the same generation. For example, creative florescence is more likely when a civilization is politically fragmented into a large number of independent states rather than united under a single empire (Naroll et al., 1971; Simonton, 1975). In line with this association, revolts and rebellions against imperial states is also conducive to creative activity (Simonton, 1975). The shared component of these two findings is that political fragmentation favors cultural diversity rather than homogeneity (Simonton & Ting, 2010). Hence, it also holds that creative florescence is positively correlated with ideological heterogeneity, that is, with a wide range of contrary religious and philosophical systems of thought (Simonton, 1976c). That said, creativity in specific domains tends to be more strongly associated with particular ideologies or cultural mentalities (Sorokin, 1937–1941). For instance, activity in the sciences tends to be enhanced by the conspicuous presence of materialism, relativism, determinism, and individualism among a generation's thinkers (Simonton, 1976b).

Second, creativity in a given generation is often a function of contextual factors that operate in previous generations, most commonly the immediately prior generation. In the first place, creative activity is correlated with the magnitude of domain-specific creativity in the previous one or two generations (Murray, 2003; Simonton, 1975, 1988, 1992a, 2017; Simonton & Ting, 2010). This aggregate outcome parallels what was reported earlier at the indi-

vidual level. These predecessors serve as role models and sometimes mentors during creative development and thus help sustain the activity across generations. In contrast, if the preceding generations lack any active creators, then the current generation will be at a disadvantage. Hence arises the difficulty of a civilization coming out of a dark age once it starts. Nevertheless, other contextual factors can work to revive a civilization's creativity when it has thus sunk into the doldrums. For example, when a civilization becomes subject to the heavy infusion of ideas from alien civilizations—whether by travel abroad or immigration—it can see a resuscitation of creativity after the foreign novelties become sufficiently assimilated (Simonton, 1997a, 2017). This aggregate effect echoes the effect of multicultural experiences that enhance creativity at the individual level (Damian & Simonton, 2014).

It was mentioned earlier that the larger sociocultural context can influence both the style and content of creative products. Not surprisingly, the same contextual influences operate at the aggregate level as well (Simonton, in press). For instance, philosophical thinking tends to become highly polarized one generation after a period of major civil disturbances, such as revolts and rebellions (Simonton, 1976e). That is, thinkers advocate more extreme and diametrically opposed positions that intellectually echo the political conflict in which they grew up.

Conclusion

It is impossible to review all of the historiometric results that demonstrate the social nature of creativity. But the above overview of findings, operating at three distinct levels of analysis, should suffice to make the necessary point. Whether we examine creative geniuses, masterpieces, or golden ages, extraordinary creativity is intrinsically social. Not only is creative achievement of that magnitude an inherent form of social influence, but various kinds of social factors lie behind the attainment of eminence. Any full account must evoke the social psychology of creativity.

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13

(Social) Identity and Creativity in Virtual Settings: Review of Processes and Research Agenda

Jérôme Guegan, Todd Lubart, and Julie Collange

Nowadays, with computer-mediated communications and virtual environments, we are experiencing a technological revolution. These technologies are present in leisure activities, but also have key applications in professional and educational domains. Indeed, through immersive simulation, users can embody their current or future professional self (e.g., a surgeon) and develop hard skills (e.g., surgery acts, Gallagher et al., 2005). Moreover, they may also embody another person (e.g., a psychotic patient) and develop softer skills (e.g., empathy, Yellowlees & Cook, 2006). Thus, virtual reality technologies allow individuals to have a digital or virtual identity, which may be close to their actual identity (in terms of ethnicity, gender, etc.) or, on the contrary, can diverge radically from it.

The present contribution aims to investigate to what extent digital identities, enacted by digital self-representations (i.e., avatars), are an efficient tool to develop and foster individuals' creativity—the capacity to generate ideas or productions that are both novel (or original) and valuable (Sternberg & Lubart, 1999). This chapter provides a social psychological analysis bringing together the contributions of theories of self-perception, social representations and social identity to understand the links between avatars and creativity.

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Changing (Social) Identity Through Avatars: A Way to Foster Creativity?

Virtual environments offer an opportunity to reduce potential barriers to creative performance and develop individuals' creativity (Ward & Sonneborn, 2011). Indeed, creativity depends on environmental aspects, but also on internal or individual factors (Amabile, 1983). A virtual environment offers a means to act on both the environment and the person. In a virtual environment, adapted spaces that support creativity can be created (see Guegan, Nelson, & Lubart, 2017). Using virtual environments, an individual's self concept and behavior can be influenced through his/her digital self-representation.

The self-concept is a cognitive structure that includes a set of mental representations of the characteristics ones uses to define who one is and regulate one's own behavior (Markus & Kunda, 1986). Interestingly, the self-concept is malleable, allowing individuals to adapt to their current environment or social context and their current motivations (Markus & Kunda, 1986; Markus & Wurf, 1987). Because of self-concept malleability, avatar embodiment allows people to experience different digital selves (Turkle, 1997). Thus, people can adapt their digital self-representation according their current goal in the virtual setting, such as dating versus gaming (Vasalou & Joinson, 2009). Those self-representations can target two types of identities included in the self-concept: personal and social identities (see Brewer, 1991; Brewer & Gardner, 1996). Personal identity includes traits and characteristics (e.g., I am friendly, I am creative) that make us unique individuals. Social identity derives from the individual's "knowledge of his [her] membership [in] a social group (or groups) together with the value and emotional significance attached to that membership" (Tajfel, 1978, p. 63) and includes the defining characteristics of social categories (e.g., I am an engineer, engineers are creative). Based on these two types of identity, Proteus and Social Identity effects of avatars have been observed.

Proteus Effect: Fostering Creativity by Acting Upon Personal Identity

Early studies in social psychology have shown the pervasive effect of wearing a uniform on behavior. For example, participants wearing black uniforms showed more aggressive behavior than participants wearing white uniforms

(Franck & Gilovich, 1988). Building on these results, Yee and Bailenson (2007) suggest that, when embodying an avatar, people identify individual identity cues, such as the avatar appearance. From these cues, people infer personal and individual dispositions and behave in conformity with them. This influence of embodied avatars on users is known as the Proteus effect (Yee & Bailenson, 2007). In a seminal study, Yee and Bailenson (2007) showed that participants embodying an attractive avatar behave in accordance with the stereotypical assumption that attractive people are extroverted and friendly (e.g., Langlois et al., 2000). More specifically, they exhibited more self-disclosure (i.e., sharing information about themselves) and approach behaviors (i.e., reducing interpersonal distance) than those who embodied an unattractive avatar. Likewise, embodying a tall avatar led people to behave more confidently during negotiations than those with a shorter avatar. Moreover, those effects seems to persist outside the context of the virtual environment (Yee et al., 2009).

The Proteus effect can be explained through self-perception theory (Bem, 1972). Bem argues that people infer their own attitudes and beliefs from observing their own behavior or themselves as a third party. Thus, individuals use external cues to infer "who they are", what are their attitudes and characteristics. Doing so, they will behave in coherence with their actual or "working" self-perception. This reliance on external cues appears even stronger when individuals are made anonymous. Indeed, when the context hides individual's actual identity, deindividuation occurs (Festinger, Pepitone, & Newcomb, 1952). Consequently, people rely more on external cues, enhancing the effect of self-perception on people's behaviors (Johnson & Downing, 1979; Yee & Bailenson, 2007). Alternatively, the influence of avatars could also be explained through priming effects (Peña, Hancock, & Merola, 2009). Indeed, situational cues may activate concepts likely to influence perception and behavior (Bargh, Chen, & Burrows, 1996). Those situational cues could be the embodied avatar, another avatar or even the contextual cues provided by the environment (Guegan et al., 2017; Peña & Blackburn, 2013). Priming leads individuals to think and to behave in a consistent manner with the situational cues.

Applying these theoretical frameworks to creativity, one might suggest that embodying a creative avatar should lead to enhance creative performance. In a research program entitled CREATIVENESS (CREAtive acTIvities in Virtual ENvironmEntal SpaceS), we investigated to what extent embodying a creative avatar (with a creative appearance) would lead to enhance creative performance (i.e., higher fluency in a divergent thinking task). Based on the

Proteus effect, we expected that users would infer from avatars' physical cues, a disposition or competencies in creativity, and then behave accordingly. For this purpose, we identified first the individual identity cues related to creative appearance in order to design creative avatars. Then, we examined the influence of these avatars on ideas generation.

Designing Creative Avatars

The Proteus effect relies on participants conforming to individual identity cues. Thus, we aimed to design avatars with physical creative cues that do not refer to any social groups, but represent "creative people". To identify those creative individual cues, we conducted three phases of testing. In a first phase, we identified categories of physical cues of creativity. To do so, 136 students in psychology were asked to list the physical characteristics of a creative avatar, whereas another 40 students were presented with two neutral avatars (one male and one female) and asked to list the modifications in order to make them appear creative. In both samples, the three most cited creative appearance clues were original clothes, presence of colors (i.e., clothes, hair), and original haircut. In a second phase, in order to operationalize creative clothes, colors and haircut, 21 students were presented with a series of avatars, which vary on only one aspect: types of clothes, color of clothes, types of haircut, and hair color. They were asked on a to what extent the person who embody the presented avatar was creative.

In the third and last phase, we developed two sets of avatars (one female and one male) that differed according the number of creative characteristics: type of clothes, color of clothes, haircut, hair color. Each set included five categories of avatars according their number of creative physical cues (i.e., from 0 to 4 creative characteristics). For each set, 20 participants were presented with each category of avatars and indicated to what extent the person behind the avatar (1) was creative, (2) able to generate novel / original ideas, (3) able to generate useful ideas, (4) had a creative personality (i.e., openness and extraversion), and finally, (5) was a creator. For both sets, the results were identical[1]: Based on the number of creative physical cues, avatars were perceived as more or less creative, able to generate creative ideas, open to experience, extraverted and likely to be a creator. However, we found no difference for the capacity to generate *useful* ideas. We were thus able to select neutral versus creative avatars (see Fig. 13.1).

[1] We conducted a one-way ANOVA with the categories of avatar as repeated measures, and more specifically examined the linear contrast.

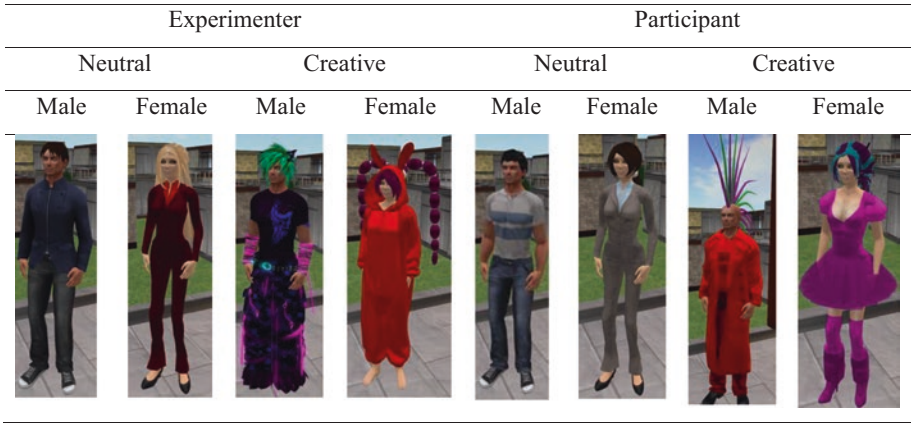

Fig. 13.1 Selected avatar in both Proteus studies according perceived creativity and gender

Creative Avatars and Creative Performance

We conducted two studies to investigate the effect of creative digital self-representations on creative performance (i.e., fluency). Moreover, we examined to what extent the Proteus effect could be attributed to a priming effect (Peña et al., 2009) by manipulating the creativity of the experimenter's avatar. Indeed, if the Proteus effect involves priming, the mere perception of a creative avatar (even if participants do not embody it) should increase performance. In both studies, participants received either a creative or a neutral avatar and, in the virtual environment, they were facing a creative or a neutral experimenter. Based on previous studies, we selected 4 low creativity avatars and 4 highly creative avatars (2 males and 2 females of each, cf. Fig. 13.1). In the first study, 80 participants were invited to perform a task in a virtual environment with a virtual experimenter. Participants were attributed a sex-matched avatar that was either neutral or creative. Moreover, the virtual experimenter always matched the sex of participants and was either neutral or creative. Once in the virtual room, the virtual experimenter asked participants to generate as many ideas as they could to solve public transportation problems in Paris and its surroundings. Creativity was assessed through fluency. The procedure of the second study ($N = 60$) was identical, except participants were immersed in the virtual situation using an oculus rift mask and gave their answers out loud.

In both studies, the pattern of results fit descriptively our expectations (cf. Fig. 13.2). However, none of the expected effects reached significance. We did not observe any significant main effects of the participants' avatar, or of the

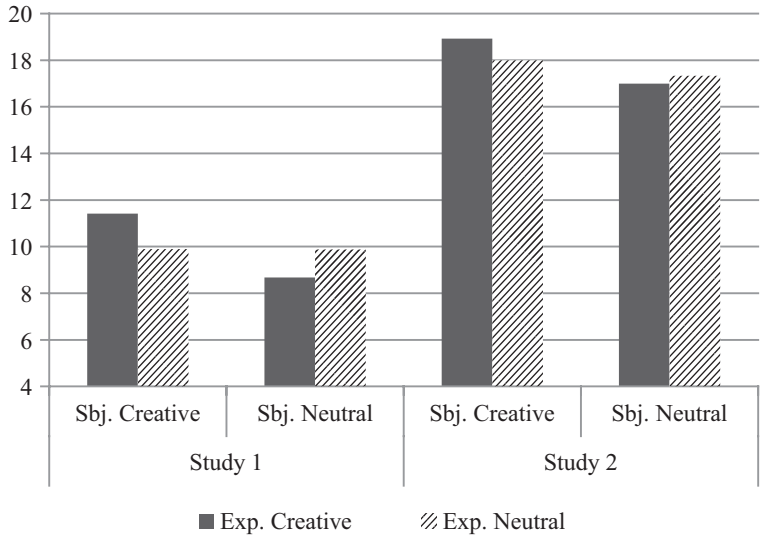

Fig. 13.2 Number of generated ideas according to the creativity of the participant's avatar and the experimenter's avatar. (Note: Exp. = Experimenter; Sbj = Subject/Participant)

experimenter's avatar. Interactions were not significant. Thus, we could not replicate the Proteus effect. Although disappointing, those results are worth reflection on the Proteus effect as presented by Yee and Bailenson (2007). Those authors argued that, in contrast to the SIDE (see below), the Proteus effect is an individual phenomenon, acting only through individual cues. In their studies, they chose to manipulate attractiveness and height. However, one might argue that beautiful or attractive people are somewhat a coherent group, targeted with a specific stereotype known as "beauty-is-good" (Griffin & Langlois, 2006). This is also the case for height (Jackson & Ervin, 1992). After careful reflection, we could argue that physical individual cues for creativity did not reflect a coherent representation of creative people as a social group. Thus, when asking participants if those avatars reflect creative person they would answer and say that they are, but they do not to prime or reflect creativity per se. Thus, it would be probable that creativity would be more accessible when embodying a social category that is (1) relevant for participants' identity and (2) known for its creativity skills.

Following these principles, we used avatars to improve creative performance of engineering students in virtual brainstorming settings (Guegan, Buisine, Mantelet, Maranzana, & Segonds, 2016). The aim was to lead engineers to embody a virtual character referring to a creative personal identity. This raises an important question: What is the right digital self-represen-

tation for creativity? And more operationally, what is the right representation to support engineers' creativity? A survey of engineering students associated with an evaluation of avatars via two independent systems led us to identify the concept of the Inventor as a common relevant creative figure (Guegan et al., 2016; Guegan, Maranzana, Barré, Segonds, & Buisine, 2015). In accordance with the assumption that the inventors are creative, a second study showed an increase in creative performance when participants embody an inventor avatar (and therefore endorse this creative personal identity; Guegan et al., 2016; see also Buisine, Guegan, Barré, Segonds, & Aoussat, 2016). In this study, participants performed two brainstorming sessions in groups of three. Participants were first assigned to one of three experimental conditions: face-to-face setting (control condition), virtual setting using neutral avatars (non-inventor condition) or using creative avatars (inventor condition). In all conditions, participants could only communicate textually. Moreover, all groups performed a second brainstorming session in a face-to-face condition just after the first session (whatever the condition of the first session). With this within-subject manipulation, we checked whether the influence of avatars in the first session could endure and increase performance in a subsequent face-to-face brainstorming session outside the virtual environment, as suggested in previous studies (Rosenberg, Baughman, & Bailenson, 2013; Yee et al., 2009; Yoon & Vargas, 2014).

The results show that inventor avatars led to higher subjective performance and higher performance in fluency and originality of ideas compared to the other experimental conditions. Interestingly, we observed no significant differences between the control condition and the non-inventor condition. The virtual nature of the session did not have any particular impact in this study, but the configuration of the identity cues influenced performance: the use of a specific digital self-representation ("I embody an inventor") can be a way to highlight an aspect of personal identity in order to influence self-perception ("I am creative"), and thus creative behavior ("I have lots of / good ideas"). Finally, these effects were also observed in the second brainstorming session, which suggests that the influence of avatars on creative performance may persist (at least for a while) outside the virtual environment.

Social and Digital Representations

The comparison of the findings of these different studies conducted with distinct populations offers some prospects for future research. In particular, one may question the presence of a meaningful and consistent shared representation of the "creative person" within the population of psychology students.

As seen above, the design of the avatars for psychology students led to the elaboration of exuberant and colorful characters, identified as creative by this population. Although these avatars share common characteristics, they do not however refer to a clear and meaningful concept. As a result, the impact of these avatars on psychology students might not be comparable to the influence of the inventor avatar on engineers. Moreover, it should be noted that colorful avatars with an exuberant look have also been evaluated by engineers and were not perceived as resembling a creative person (no more creative than neutral avatars; see Guegan et al., 2016). This finding is consistent with the principles of Social Representation Theory (Moscovici, 1961), according to which different social groups can have different representations of the same object. Thus, because students in psychology and in engineering do not share the same social representation of creativity, they have contrasting perceptions of what a "creative person" looks like. More importantly, social representation theory postulates also that some groups will create a social representation (i.e., *representational process*) about a given object (because the object involves identity issues for the group, generates uncertainty, etc.; e.g., Moliner, 1993) whereas other groups will not. Thus, a population may have created a social representation of creativity (with a structure referring to a particular image of the creative person) and not another. Indeed, creativity leads to invention and innovation and is thus part of the engineer's essential skills, but it is less central to psychologists' skills, who would have less need to initiate a representational process. Engineers would therefore have created a social representation of creativity where the figure of the inventor may be important, known and desirable, a concept that shapes their perception of the creative person. Conversely, the representation of psychology students does not seem to be elaborate and does not evoke a clear figure of the creative person.

In this respect, the specificities of these two populations could be at the origin of the discrepancies observed in our studies. These elements are important because they highlight (at least theoretically) the influence of social cognitions and representations on the perception of digital representations in different groups. Thus, the behavioral influence of avatars and their ability to activate clear concepts could be rooted in the shared representations of the population (such as the link between black color and evil; Peña, Hancock, & Merola, 2009). In this perspective, the goodness of fit between digital and social representations (if elaborated by the targeted population) would moderate the impact of avatars on behavior and creative performance. So, using avatars that do not refer to structured social representations/cognitions could induce little or no expected effects (even if this same avatar induces substantial effects with another population). A better understanding of the relationships

between personal identity, digital and social representations offers challenging perspectives for further research.

The Influence of Group Processes: Fostering Creativity by Acting Upon Social Identity

The first models of Computer-Mediated Communications (CMC) considered anonymity and physical isolation as conducive to social loss and reduction of group pressure (Kiesler, Siegel, & McGuire, 1984; Sproull & Kiesler, 1986). For example, according to the *reduced social cues model* (Kiesler et al., 1984), anonymity decreases the non-verbal and paralinguistic cues (e.g., gestures, gaze, facial expressions) necessary for communication and consequently impairs the mutual understanding required for collaboration (Sproull & Kiesler, 1986; Straus & McGrath, 1994). In addition, the decrease in social cues might minimize the influence of social norms and facilitate the emergence of aggressive behavior in anonymous CMC. These proposals are consistent with traditional group models in social psychology, which consider spatial proximity and physical co-presence as essential to group identification and to the creation of social norms (e.g., Kiesler & Cummings, 2002; Lea & Giordano, 1997). However, several studies have shown that CMC do not necessarily imply a loss of social relations (e.g., Parks & Floyd, 1996; Spears, Lea, & Postmes, 2007; Walther, 1996). Instead, anonymous CMC can foster the emergence of group identity and strengthen its influence (e.g., Postmes, Spears, & Lea, 1998; Postmes, Spears, Sakhel, & de Groot, 2001). This apparent paradox can be explained in light of the *social identity perspective*.

Social Identity Theory (Tajfel & Turner, 1979) posits that identity varies along a continuum referring to interpersonal behavior on one side ("I" vs. "you"; personal identity) and intergroup behavior on the other ("us" vs. "them"; social identity). Social identity relies on common features that are shared by group members and distinguish them from relevant other groups. In this perspective, group membership leads members to make intergroup comparisons promoting the in-group (in-group favoritism) because a positive evaluation of one's in-group may contribute to a positive evaluation of the self. Extending social identity theory, Self-Categorization Theory (SCT; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) suggests that, depending on the situation, the individual will feel more or less part of a given social category. As social categories are internalized, SCT views the self as a variable, multi-faceted cognitive structure that combines individual components with elements of a salient category in a given context. Indeed, as a function of the

context (*accessibility* and *fit*; Turner et al., 1987; Turner, Oakes, Haslam, & McGarty, 1994), social categories may be salient and individuals see themselves and the others not on the basis of personal characteristics but as representatives of salient groups (*depersonalization process*; Turner et al., 1987). Thus, unlike in earlier approaches, social group formation is not necessarily related to the physical proximity between members, because "the group exists within the individual as a cognitive representation" (Rogers & Lea, 2005, p. 153). As a result, other group members need not be physically present or visible for a sense of belonging to be activated.

Following this line of thought, the *Social Identity model of Deindividuation Effects* (SIDE; Reicher, Spears, & Postmes, 1995; Spears & Lea, 1992, 1994) extends social identity theory and SCT to the field of computer-mediated communication. According to SIDE, in anonymous situations, interlocutors are not focused on individual differences or personal characteristics. Making social identity salient with membership cues (e.g., group name), while masking personal information, might lead people to switch from the interpersonal pole to the intergroup pole (Tajfel & Turner, 1979), and thus increase the depersonalization process (Turner et al., 1987). In other words, not perceiving the specificities of other group members, individuals self-categorize at a group level of inclusion (Turner, 1985) and reason on the basis of social categories (Postmes et al., 2002). Social identity becomes then even more salient and mediates the definition of self in such a situation. In this perspective, avatars can also be used to enhance the salience of social identity, because they mask idiosyncratic attributes of group members while making it possible to manipulate the way each one is represented to the members of his/her group. In line with this, several studies have shown that similarity between avatars (i.e., identical appearance of avatars used by each group member) is conducive to group identification, both in intergroup (Lee, 2004; Kim, 2011) and intragroup contexts (e.g., Kim & Park, 2011).

Hence avatar-mediated communication may be used to support group processes and collaboration in the context of creative work. By considering themselves as members of a group rather than people who are "lumped together", individuals could be more involved in creative work and may implement more easily strategies improving group performance. In particular, increasing the salience of social identity would likely support the reduction of social loafing effects, because the individual perceives him/herself as a member of the group (e.g., James & Greenberg, 1989; Williams, Karau, & Bourgeois, 1993). If individuals share the same salient social identity, they may no longer perform for their own sake, but on behalf of the group. This may even lead to the

emergence of social laboring (Haslam, 2004; van Dick, Tissington, & Hertel, 2009; Worchel, Rothgerber, Day, Hart, & Butemeyer, 1998), that is the opposite phenomenon to social loafing: individuals working as groups and for the group exhibit increased, rather than decreased performance. This view strongly echoes Osborn's (1957) initial work advocating the brainstorming method. However, much of the existing literature concerning the creative performance of brainstorming groups focuses on comparing performance within the group, without addressing the issue of whether participants perceive themselves as group members or not. Similarly, only few studies have linked SIDE effects to group performance, but some findings indicate that anonymity may improve group identification in collaborative tasks (Michinov, Michinov, & Toczek-Capelle, 2004). Tanis and Postmes (2008) found also that individuals in anonymous dyadic computer-mediated communication enhances both subjective and objective performance, this effect being mediated by shared identity. Following the SIDE model, a recent study conducted in a virtual environment has shown that the presence of social identity cues (i.e., school color) provided on avatars increases the enjoyment of participants in a collaborative game (Peña et al., 2017). Following the same theoretical principles, we used avatars to support group creativity by providing social identity cues while masking the personal attributes of each group members (Guegan et al., 2017). In this study, social identity cues were introduced through avatars' clothes. Participants being engineering students, the traditional clothing of the engineering school was used as a meaningful social identity cues (see Fig. 13.3). Moreover, because social identity cues are expected to stimulate sense of belonging and performance by enhancing the salience of group identity, their influence is not limited to virtual environments and computer-mediated contexts. Thus, this experiment aimed also to compare group performance in virtual and face-to-face settings, while keeping social identity cues constant. The results showed that the presence of social identity cues led to increased creative performance both in face-to-face and virtual settings.

Thus, beyond the Proteus effect, avatars can also improve creative performance through social identity processes and group membership. Where the Proteus effect focuses on individual identity cues, avatars can also, through social identity cues, influence processes that involve directly the individual and his/her group. Future research should therefore strive to measure the respective impact of the appearance of individual avatars and of social identity processes related to groups of avatars on creative performance. From a theoretical viewpoint, such analyses would be a major step in understanding the social and personal facets of the processes involved in the use of avatars.

Fig. 13.3 Virtual version of the traditional clothing worn by engineering students. (Guegan, Segonds et al., 2017)

Conclusion

By bringing together all the considerations discussed in this chapter, it appears that digital self-representations may influence the individual through processes derived directly from the personal and social components of identity. This can have beneficial consequences on creative performance if the identity cues (social or personal) provided by the virtual context are compatible with the task and relevant to individuals. In this perspective, it seems necessary to add that these identity processes are oriented and structured by a socio-representational and cultural context that gives value and meaning to the virtual content. Thus, although the Proteus effect is defined as an individual phenomenon, its existence is based on socially shared representations that may structure the meaning given to the appearance of the avatar. It is at least in this sense that the results of our studies converge, and many future works will be needed to advance understanding of the influence of avatars on cre-

ative processes. In particular, disentangling the effects of the personal and social components of identity, examining their combined influence according to the characteristics of individuals and groups offers a challenging way to optimize the use of virtual environments for creativity.

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14

The Role of Structure and Instruction on Creative Idea Evaluation and Selection

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Structuring Team Idea Evaluation and Selection of Solution: Does It Influence Creativity?

Creativity has been defined as the generation of products, ideas, or processes that are both novel and useful (Amabile, 1996; Mumford & Gustafson, 1988). For modern organizations, creativity has become a cornerstone of survival and competitiveness, as new challenges continually arise under rapidly changing economic, technological, and competitive conditions. The importance of creativity for organizational survival in today's increasingly complex and global environment has been recognized by organizational leaders. A report by IBM, in which over 1500 CEOs from all over the world and a wide variety of industries were interviewed, identified creativity as the most important characteristic for managers (IBM, 2010). However, our understanding of creativity and innovation and the factors that facilitate or hinder it, is still limited.

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Cognitive models of individual creativity suggest there are multiple cognitive processes that underlie creativity (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991; Ward, Smith, & Finke, 1999). Most creative cognition models include three core processes: problem identification and construction, idea generation, and idea evaluation and selection (Reiter-Palmon, Wigert, & de Vreede, 2012). Various studies have examined how these processes can be effectively utilized to help individuals to develop and implement creative ideas (Mumford, Reiter-Palmon, & Redmond, 1994; Mumford, Supinski, Baughman, Costanza, & Threlfall, 1997; Reiter-Palmon, Mumford, & Threlfall, 1998). Of those, the majority of the work has focused on idea generation, with limited attention given to what comes before and after idea generation – that is problem identification and construction and idea evaluation and selection (Reiter-Palmon, 2018).

This chapter focuses on idea evaluation and idea selection, the processes that occur *after* idea generation. Idea evaluation and selection are critical for creative problem solving; in organizational settings, many ideas are generated, but only a few of the ideas reach the implementation phase (Sharma, 1999). Further, the quality and originality of the final idea selected for implementation will depend on the quality of the evaluation and selection process.

Idea evaluation refers to judging the degree to which an idea would be instrumental toward attaining desired outcomes. Once problem solvers have multiple solutions in hand, both individuals and teams must consider which of the solutions are worthy of more attention. Ideas must be evaluated in relation to specific standards (Mumford, Lonergan, & Scott, 2002). The idea evaluation process is typically viewed as more convergent; however, it also includes divergent elements (Runco & Chand, 1995), such as the need to forecast, for example, which requires thinking about various options and their impact. *Idea selection* refers to the selection of the idea(s) that will be implemented.

A key question for idea evaluation research is whether individuals can recognize creative ideas. Research at the individual level reveals that overall, individuals are able to accurately evaluate ideas for originality and novelty (Basadur, Runco, & Vega, 2000; Runco & Basadur, 1993; Runco & Chand, 1995; Runco & Smith, 1992; Runco & Vega, 1990). However, it was found that those who generate more creative ideas, or are more creative, are also more likely to recognize creative ideas generated by others (Basadur et al., 2000; Blair & Mumford, 2007; Kaufman, Beghetto, & Watson, 2016). Individuals are also more likely to choose creative solutions if they are instructed to do so (Lonergan, Scott, & Mumford, 2004).

Research has also evaluated the relationship between the quality, originality, and evaluation of creativity. Benedek et al. (2016) suggested that people tend to underestimate the creativity of ideas presented to them. Diedrich, Benedek, Juak and Neubauer (2015) found that novelty was a stronger predictor of creativity relative to usefulness. The role of usefulness only emerged when ideas were highly novel. Rietzschel, Nijstad, and Stroebe (2010) found that instructions to focus on choosing a creative idea resulted in the selection of more original ideas. Unfortunately, this also resulted in choosing ideas of lower quality at the same time. Finally, Blair and Mumford (2007) found that participants tended to reject highly original ideas and were more likely to select ideas that were routine and easy to understand. Put together, these results indicate that, when selecting ideas, individuals tend to prefer quality or usefulness and avoid choosing original ideas that are viewed as more risky. Original ideas are only chosen when participants are specifically asked to do so, however, this typically results in a complete focus on originality and the exclusion of quality or usefulness.

Although creative problem solving processes have primarily been studied at the individual-level, it is teams that are often tasked with working on problems that require creative solutions and innovative outcomes. As a result, an interest in team creativity has recently emerged (de Vreede, Boughzala, de Vreede, & Reiter-Palmon, 2017; Mumford & Hunter, 2005a; Reiter-Palmon, Herman, & Yammarino, 2008). While certain aspects of team creativity and innovation have been investigated, such as team diversity and team social processes, little attention has been paid to team cognitive processes. Similar to individual-level work, the majority of the work on team cognitive processes has focused on idea generation or brainstorming, and limited attention has been given to processes such as constructing problems, evaluating and selecting possible solutions (Reiter-Palmon, 2018).

Early work on team idea evaluation and selection has focused on comparing nominal groups with interactive groups (Faure, 2004; Girotra, Terwiesch, & Ulrich, 2010; Putman & Paulus, 2009; Rietzschel, Nijstad, & Stroebe, 2006). These studies found that nominal groups generated more ideas, and more original ideas, than interactive groups, whereas interactive groups generated more feasible ideas. However, ideas selected for final consideration were of equivalent quality, suggesting that groups may not be better than ideas generated by individuals ideas pooled from a group of individuals working individually (nominal groups). However, other work suggests that under certain conditions teams can perform better than individuals in terms of idea selection (Mumford, Feldman, Hein, & Nagao, 2001; Nijstad, Rietzschel, & Stroebe, 2006).

As a result of these findings, researchers have tried to understand the processes associated with idea evaluation and selection in teams. Kennel and Reiter-Palmon (2012) examined team creative idea evaluation and selection outcomes. Teams were presented with 10 ideas that were previously rated for quality and originality. Teams were asked to evaluate the quality and originality of each of the ideas following a specific rubric prior to coming to consensus in selecting the best solution to solve the problem. Teams that more accurately evaluated the quality of the set of solutions chose ideas of higher quality to solve the problem, whereas teams that more accurately evaluated the originality of the set of solutions chose ideas of higher creativity (i.e., originality *and* quality). Consistent with the notion that evaluations guide the choice of solutions (Basadur, 1994; Faure, 2004), Kennel and Reiter-Palmon's study suggested that better idea evaluation outcomes were correlated with better idea selection outcomes. However, overall, teams did not always select the best ideas out of those presented. Only 55% of the teams selected high quality or creative ideas. The other teams chose ideas that they evaluated as being good but were of low or moderate quality as assessed by experts.

It is less clear which factors can facilitate idea evaluation and result in selection of creative ideas in teams. Based on the finding that instructions to choose creative ideas result in the choice of more creativity ideas by individuals (Lonergan et al., 2004), we have sought to determine the role of instruction, guidance, and structure on idea evaluation in teams.

The purpose of this research is to examine the effect of different idea evaluation and solution selection instructions and structure on the accuracy of team solution evaluations and the selection of solutions to solve a complex and ill-defined problem. First, we examined how the level of specificity and detail provided in the evaluation process influenced the accuracy of team evaluations and the selection of creative solutions to solve the problem. Second, we examined how structured and unstructured selection processes influenced the selection of creative solutions to solve the problem.

Method

Participants

Participants were 152 undergraduate students, randomly assigned into 38 teams of four. Of the sample, 61.9% were female and 38.1% were male; 73% were Caucasian, 8.3% listed their ethnicity as Mixed or Other, 7.9% were African American, 5.3% were Hispanic/Latino, 2.6% were Asian American;

2% were freshmen, 4.1% were sophomores, 39.5% were juniors, and 54.4% were seniors. Three teams failed to fully complete the evaluation and selection tasks, thus, the analyses are based upon 35 teams.

Conditions

A 2 (rubric evaluation vs. open evaluation) × 2 (iterative selection instructions vs. open selection instructions) between-subjects design was employed such that each team was randomly assigned into one of four different conditions, reflecting the two different idea evaluation and idea selection instruction methods.

In Condition 1 (rubric evaluation, iterative selection), teams evaluated 15 solutions with the assistance of a rubric specifying examples of solutions that fit each of the five designated levels of solution quality and originality. These teams then used a structured iterative selection technique in which each team member first individually selected four to five solutions that they would use to solve the problem. Then the team members shared their selections with each other and narrowed their desired solution selection alternatives to two solutions. Finally, the team members came to a consensus regarding one solution they would use to solve the problem.

In Condition 2 (rubric evaluation, open selection), teams evaluated the 15 solutions with the assistance of the rubric described in Condition 1. However, these teams were instructed to simply select a solution to solve the problem without any further guidance or structure to the selection process.

In Condition 3 (open evaluation, iterative selection), teams were instructed to evaluate the quality and originality of the 15 solutions without any further definition of quality and originality. These teams utilized the iterative selection technique described in Condition 1.

In Condition 4 (open evaluation, open selection), teams were instructed to evaluate the quality and originality of the 15 solutions without any further definition of quality and originality. These teams were then instructed to simply select a solution to solve the problem without any further guidance or structure to the selection process.

Procedure

All teams were asked to carefully review a realistic, ill-defined story problem. Each team then reviewed 15 possible solutions to the problem, which were generated by students from a previous study. Teams were asked to evaluate

each solution for its level of quality and originality with the assistance of either a rubric specifying examples of solutions that fit specific levels of quality and originality (Condition 1 and 2) or instructions to evaluate quality and originality without any further definition of the terms (Conditions 3 and 4). Once all 15 solutions were evaluated, teams were asked to select a solution to solve the problem using either the iterative solution selection technique (Conditions 1 and 3) or instructions to select a solution to solve the problem without any further information (Conditions 2 and 4).

Upon completion of the evaluation and selection task, all participants then individually completed additional surveys and provided demographic information. Upon completion of these materials, participants were debriefed about the study and thanked for their participation.

Dependent Variables

Recall that the 15 solutions provided to the teams for evaluation were selected from a pool of solutions generated by students from a previous study. In this previous study, all of the solutions were evaluated independently for quality (i.e., completeness and effectiveness) and originality (i.e., novelty, imagination, and structure) by trained raters using a modified consensual assessment technique (CAT). The inter-rater reliability of the raters' (further called "experts" in this paper) originality ratings and quality ratings, calculated from the original set of solutions, were good with an r_{wg} of 0.81, and an ICC of 0.81, $F(363,726) = 5.51$, $p < 0.05$, and an r_{wg} of 0.78, and an ICC of 0.87, $F(364,728) = 7.62$, $p < 0.05$, respectively. Solutions used in this study were then selected by the study researchers to represent a variety of combinations of quality and originality (i.e., high quality and originality, low quality and originality, high quality and low originality, low quality and high originality, and moderate quality and originality).

To examine each team's overall average level of accuracy in evaluating the presented solutions for quality and originality, the mean absolute value of the difference between each team's evaluation score from the expert evaluation score separately for the quality and originality ratings were calculated. Greater absolute values of these accuracy indices indicate that the teams' solution quality or originality evaluations were less accurate than the expert evaluations.

The nature of the solution the team selected to solve the problem was examined in two ways. First, the level of quality and originality of the solution that each team selected to solve the problem based upon the *team's* quality and

originality evaluations of the selected solution were examined. This provided a snapshot of the characteristics of the solutions that teams selected based upon the team's solution evaluations. Second, the nature of the solution that each team selected to solve the problem based upon the *expert* ratings of the solution the team selected to solve the problem were also examined. In other words, it was examined whether teams accurately selected an "optimal" solution, that is, a solution that is either (a) high in quality alone, or (b) "creative" (i.e., high in quality and original), by examining the expert ratings of quality and originality for the solution the team selected to solve the problem. Thus, the nature of the solution that the team selected was coded based upon the expert ratings of the solution that the team selected, into three binary dichotomous variables: selection of a creative solution (1) or not (0), selection of a high quality solution (1) or not (0), and selection of a non-optimal solution to solve the problem (1) or not (0).

Results

A paired samples *t*-test (across all study conditions) indicated that teams were more accurate in their average originality evaluations ($M = 0.83$) than in their average quality evaluations ($M = 1.05$), $t(34) = 3.61$, $p = 0.001$.

To examine the effect of the different idea evaluation (rubric vs. open) instructions on the accuracy of team solution quality and originality evaluations, we conducted a One-Way Analysis of Variance. Team evaluation accuracy for quality, $F(1, 33) = 1.53$, $p = 0.23$, or originality, $F(1, 33) = 0.10$, $p = 0.75$, did not differ significantly based on the use of rubrics. This finding was unexpected: we anticipated that the teams who utilized the rubric would more accurately evaluate solution quality ($M = 0.99$) and originality ($M = 0.81$) than teams who were provided with minimal information about quality ($M = 1.11$) and originality ($M = 0.85$). However, it seems as if teams similarly evaluated solution quality and originality regardless of the amount of information, detail, and structure provided to evaluate solution quality and originality.

Overall, across study conditions, the teams selected solutions that, on average, the team rated as very high in quality ($M = 4.54$) and originality ($M = 3.94$). Additionally, 94.3% ($n = 33$) of the teams selected a solution they rated as high (4 on 5-point scale) or very high (5 out of 5) on quality, while 5.7% ($n = 2$) of the teams selected a solution they rated as of average quality (3 out of 5). However, there was more variability in the level of originality of the solution the teams selected: 68.6% ($n = 24$) of the teams selected

a solution they rated as original (4 out of 5) or very original (5 out of 5), 14.3% (n = 5) of the teams selected a solution they rated as neither original nor unoriginal (3 out of 5), 14.3% (n = 5) of the teams selected a solution they rated as unoriginal (2 out of 5), and 2.9% (n = 1) of the teams selected a solution they rated as very unoriginal (1 out of 5). This indicates that teams nearly always selected solutions the team members felt solved the problem (based on quality), but did not always select an original solution. However, most (about two-third) teams indeed selected what can be considered creative solutions – solutions that they evaluated as high in quality and high in originality.

We examined the effect of the different idea evaluation (rubric vs. open) and selection (iterative vs. open) instructions on the level of quality and originality inherent in the solution the team selected to solve the problem. We first assessed solution selection quality and originality based upon the team's assessments, and conducted a 2 × 2 Analysis of Variance. There was a significant main effect of the solution selection instructions on the level of quality in the solution the team selected to solve the problem, F (1; 31) = 4.65, p = 0.04, η^2 = 0.13, such that teams who used the iterative selection technique selected a solution they rated of lower quality (M = 4.33) than teams who were asked to simply select a solution to solve the problem without any further guidance or structure to the selection process (M = 4.76). Surprisingly, there was no significant effect of the solution selection instructions on the level of originality in the solution the team selected to solve the problem. However, there was a significant interaction between the evaluation and solution selection instructions on originality, F (1; 31) = 5.56, p = 0.03, η^2 = 0.15 (see Fig. 14.1). Teams who evaluated the solutions with the assistance of a rubric and utilized the iterative selection technique selected a solution that they rated as higher in originality (M = 4.56) than teams who evaluated the solutions with minimal information about quality and originality but also utilized the iterative selection technique to select a solution (M = 3.11). Additionally, teams who evaluated the solutions with the assistance of a rubric and selected solutions with minimal guidance selected a solution that they rated as lower in originality (M = 3.89) than teams who evaluated the solutions with minimal information about quality and originality and selected solutions with minimal guidance (M = 4.25).

Although we can examine the nature of the solution the team selected based upon the team's evaluations of solution quality and originality, we desire for teams to accurately select optimal solutions. Clearly, solutions that are high in quality (i.e., appropriate and useful based on expert evaluations) are optimal in solving problems; however, when teams strive to be innovative and

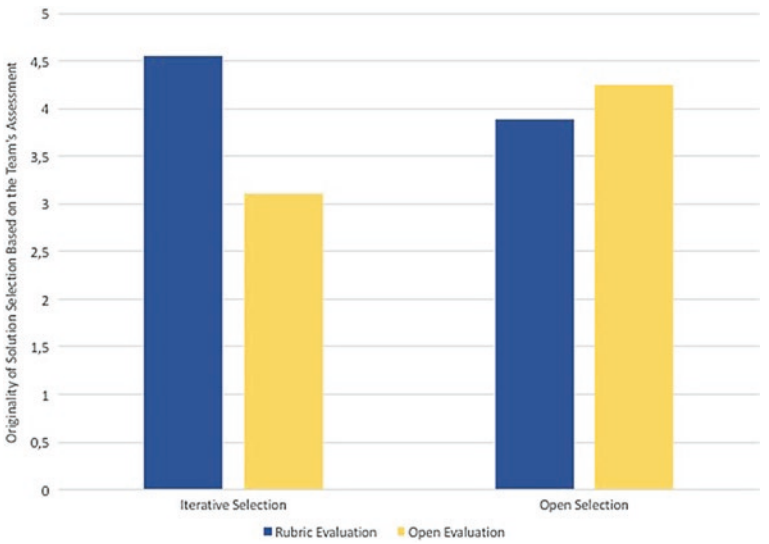

Fig. 14.1 Evaluation and selection condition effects on the originality of the solution selection based on the team's assessment of the originality of the selected solution

creatively solve problems, optimal solutions would be both high in quality and original (i.e., novel and unique as evaluated by experts) – we consider this a truly creative solution. Thus, we examined the nature of the solution the team selected based upon expert evaluations of the level of quality and originality of the solution that the team selected. From this perspective, 37.1% (n = 13) of the teams accurately selected a creative solution to solve the problem, 40% (n = 14) of the teams accurately selected a high quality alone solution to solve the problem, and 22.9% (n = 8) of the teams selected a non-optimal solution to solve the problem. While this ratio is better than the one indicated by Kennel and Reiter-Palmon (2012), almost a quarter of the teams selected solutions that were less than optimal, and teams were just as likely to choose a solution that was high quality as they were to choose a creative solution, even when they were aware of both standards.

To further explore how the evaluation and selection instructions influenced the accurate selection of solutions, we conducted a 2 × 2 Analysis of Variance to examine the effect of the different idea evaluation (rubric vs. open) and selection (iterative vs. open) instructions on the level of quality and originality inherent in the solution the team selected to solve the problem, based upon expert rater assessments of the solution quality and originality. The different evaluation and selection instructions had no significant effects on the quality of the solution the teams selected. However, there was a marginally significant main effect of the evaluation instructions, $F(1, 31) = 3.44$, $p = 0.07$, $\eta^2 = 0.10$,

such that teams who used the rubric to evaluate the solutions were more likely to pick a solution of higher originality (M = 3.65) to solve the problem than were teams provided with minimal information about quality and originality (M = 3.02). Surprisingly, there was no significant main effect of the solution selection instructions on the level of originality as rated by experts. However, there was a significant interaction between the evaluation and solution selection instructions, F (1, 31) = 4.63, p = 0.04, η^2 = 0.13, such that teams who evaluated the solutions with the assistance of a rubric and utilized the iterative selection technique selected a solution that was inherently of higher originality (M = 3.85) than teams who evaluated the solutions with minimal information about quality and originality but also utilized the iterative selection technique to select a solution (M = 2.56). Those teams who evaluated the solutions with either the assistance of a rubric or with minimal information about quality and originality and then selected solutions with minimal guidance selected solutions that were of similar levels of originality (M = 3.45, and M = 3.54, respectively) (Fig. 14.2).

Finally, we examined the accuracy of team solution quality and originality evaluations and the accurate selection of optimal solutions to solve the problem across all study conditions. First, the average team solution quality

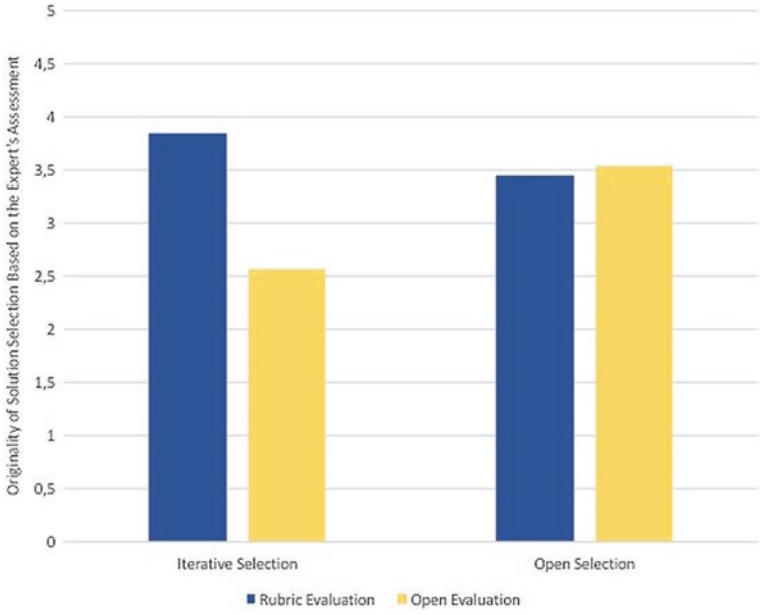

Fig. 14.2 Evaluation and selection condition effects on the originality of the solution selection based on expert's assessment of the originality of the selected solution

and originality evaluation accuracy indices positively related to one another, suggesting that teams who were more accurate in their solution originality ratings also demonstrated more accurate solution quality evaluations, $r = 0.35$, $p = 0.04$. In addition, teams who were more accurate on average in their solution quality evaluations were more likely to accurately select a creative solution to solve the problem, $r = -0.30$, $p = 0.08$, whereas a trend is emerging such that teams who were more accurate on average in their solution originality evaluations may also be more likely to accurately select a creative solution, $r = -0.27$, $p = 0.11$. Thus, accuracy in solution quality and originality evaluations may facilitate the accurate selection of a creative solution to solve a problem. Team average solution quality and originality evaluation accuracy did not significantly relate to the accurate selection of a high quality solution alone. However, teams who were less accurate in their average solution quality evaluations were significantly more likely to select a non-optimal solution to solve the problem, $r = 0.55$, $p = 0.001$.

Discussion

The purpose of this study was to evaluate the role of providing instructions and structure for idea evaluation (in the form of definitions and rubric) and idea selection (by creating a two-step system) on the accuracy of evaluation and ultimate idea selection by teams. The main findings of this study suggest that having a rubric to help in evaluations of quality and originality did not increase accuracy of evaluation for teams that had them. Two different measures were used to determine the effect of instructions and structure on idea selection – one based on the teams' own evaluation of quality and originality, and one based on expert ratings. When considering solution quality and originality from the perspective of the team evaluations, teams tended to choose ideas they considered as high quality, and the majority of the teams also chose solutions that were also original. With regards to solution quality, an iterative solution selection process resulted in choosing solutions of lower quality, which is an unexpected finding. With regards to originality, having instructions and structure for both the evaluation process and the selection process resulted in selecting ideas that were the most original. When considering solution quality and originality from the perspective of expert ratings, teams tended to choose equally solutions that were either high quality only or creative (high quality and high originality), however, a sizable minority (23%) selected solutions that were less than optimal. While no effects of instructions and structure were found on the quality of selected solutions, a similar pattern

emerged for originality – teams that had instructions and structure for both the evaluation and the selection process selected the most original solution based on expert ratings.

Theoretical and Practical Implications

This study is one of the first to investigate both idea evaluation and idea selection in teams. Previous studies have typically focused on idea selection, and have not assessed the role of idea evaluation, or the relationship between idea evaluation and idea choice (Reiter-Palmon, 2018). Not surprisingly, teams always pick ideas that they (the team) think is of high quality, and also typically choose ideas that they think are original. However, there is a discrepancy between what teams think and what experts think – which results in choosing less optimal solutions. Our results indicate that accurate evaluations of both quality and originality contribute to choosing more creative ideas. These findings lend some empirical support for the idea evaluation and selection model proposed by Mumford et al. (2002), in that judgments of the degree to which an idea may be instrumental toward attaining desired outcomes precede and may influence the selection of solutions that achieve these outcomes. Further, the consistency of our findings with their idea evaluation and selection model presents an opportunity to further explore applications and enhancements of this model as it relates to creative idea evaluation and selection in teams. Therefore, researchers should focus on understanding the factors that contribute to idea evaluation accuracy, and not just on idea selection.

The results, to some extent, indicate that teams have a preference for solutions of high quality rather than creative solutions, even when the instructions indicate that focusing on both quality and originality is important. This finding is similar to past research that suggests that people prefer ideas that are high quality but less original (Blair & Mumford, 2007). While there are many occasions that creativity is not required, and therefore a focus on quality or effective solutions is appropriate, there are times when it is important to choose creative ideas, those that are both high in quality and originality. Past research suggested that when people are instructed to choose creative ideas, the do so (Lonergan et al., 2004), our research indicates that this is not always the case. Understanding when, and under what conditions, individuals are more likely to choose a creative idea has important practical implications.

In addition, the results of the study contribute to our understanding of the factors that may influence both the evaluation and choice of solutions. There is a discrepancy between what teams think are high quality and highly original solutions and what experts think – which, findings suggest, may result in

teams choosing less optimal solutions to solve a problem. This discrepancy appears to originate in the evaluation process, further supporting the need for additional research on how to optimize team evaluation accuracy by improving clarity around the standards against which available options are assessed. From a practical perspective, this discrepancy may partially explain why some solutions that appear optimal to teams developing new products and solutions may fail when presented to end-users and consumers.

Limitations and Future Directions

This study is not without limitations. First, the study included a relatively small sample of 35 teams, across four conditions. As a result, it is possible that low power has prevented some effects from emerging. Second, the study used only one problem to which solutions were provided. While teams had the opportunity to evaluate 15 different solutions, they only engaged in one idea selection task. Further, all solutions related to the same problem. If task effects, which have been found in other studies, are present (Reiter-Palmon, Illies-Young, Kobe Cross, Buboltz, & Nimps, 2009), then the results of this study will show an incomplete picture. Therefore, the results of this study need to be replicated with additional tasks. Third, the study evaluated only one approach to provide structure and guidance in the evaluation and selection process, respectively. Additional mechanisms for idea evaluation and selection structure and guidance, such as the degree of detail in the rubric (Frederiksen & Knudsen, 2017), attention guidance, and discussion encouragement (Seeber, Maier, de Vreede, & Weber, 2017), and practice for evaluation or guidelines for discussion in the selection process need to be evaluated. Finally, given our emphasis on creative idea evaluation and selection activities in teams, the effects of team composition and social processes on idea evaluation and selection and the role of leadership need to be evaluated.

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15

How Do You Manage Evaluation? Attentive and Affective Constituents of Creative Performance Under Perceived Frustration or Success

Sergio Agnoli, Laura Franchin, Enrico Rubaltelli, and Giovanni Emanuele Corazza

Introduction

Creativity is one of the most energy-spending mental activities for human beings. This is not only because thinking creatively requires challenging the norms and using instead unconventional and "heuristic-free" thinking strategies, but also because creativity is a high risk activity (Sternberg & Lubart,

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1996; Tyagi, Hanoch, Hall, Runco, & Denham, 2017). The possibility of failure is indeed tangible, being proportional to the difficulty in generating a product that is both original and effective. As proposed by Corazza (2016), most of the creative process is characterized by inconclusive tries, and creative achievement is only a rare precious gem in a vast sea of exploration. Nevertheless, the search for this gem leads people on different creative paths, which give rise to different forms of creativity, from personal creativity (Runco, 1996) to the most eminent forms of creativity (Simonton, 2010). However, in every declination of creativity, difficulties always arise during the generative process and people should be persistent in order to achieve creative success, spending a large quantity of their mental energy not only for the generation, but also to gain appreciation from the external audience for their process outcomes. The ability to face evaluation is indeed a key element for reaching creative success. Whatever the result of a creative act, one has always to face evaluation, which is a potential source of stress during the ideational process (Byron, Khazanchi, & Nazarian, 2010). Evaluation entails the comparison and possible contrast with the norms, as well as a direct or indirect confrontation with experts in the field. More than other elements in the creative process, evaluation evidences the social nature of this process. Never can a creative act be considered as separated from the social and cultural context at any given time. According to the distributed creativity perspective, for example, creativity is a relation (e.g., Glăveanu, 2012, 2015). However, while social interactions are always underlying the generative process, they become particularly prominent in the evaluation of the process outcomes (Glăveanu, 2015). In other words, the comparison with culture and society is always present even when the creative process is performed in complete isolation. Evaluation is therefore a source of stress for the creator, since it requires a continuous comparison with the social and cultural context. The probability for failure is high, because of the subjective and somewhat arbitrary requirements defining originality and effectiveness within a social context. A fundamental question arises: why are some people more able to face evaluation and resist the frustration rising from repeated inconclusive outcomes, whereas other people give up at some point in the process? Are the former more able to use in an adaptive manner (for a creative purpose) specific psychological resources? These issues have been addressed in a recent study (Agnoli, Franchin, Rubaltelli, & Corazza, 2018), which we will describe in this chapter.

Specifically, our study focused on the analysis of the individual differences defining creative performance during situations of creative frustration and creative success. In particular, the differences in the ability to manage attentive and emotional resources have been explored during these condi-

tions. The starting point of this research is that the creative process is characterized by a continuous assessment, constituted by iterative cycling between idea generation and idea evaluation (Finke, Ward, & Smith, 1992). During the creative process, the generator must indeed constantly deal with her/his personal assessment, constituted by her/his social and cultural norms and assessment criteria (Glăveanu & Tanggaard, 2014), as well as by environmental and external evaluation feedback (Amabile, 1979; Silvia & Phillips, 2004). Evaluation provides indeed information about the effectiveness of the ideational activity, estimating the failure or the success of the creative prototype, temporarily accepting non-optimal solutions or pushing ahead, refining the idea by exploring alternative solutions (Lubart, 2001). Needless to say, positive or negative evaluations have different effects on the creative process. More interestingly for the purpose of the study here described, positive or negative evaluations have different effect on different creators. At a first glance, it could appear that repeated failures during a creative process could lead to the perception of creative frustration (He, Yao, Wang, & Caughron, 2016; Sapp, 1992) that could produce a mortification of the creative attempts (Beghetto, 2014) and lower perceived self-efficacy (Baumeister & Tice, 1985). On the contrary, repeated creative success could generate the opposite overwhelming emotional condition, a sort of ecstasy in front of repeated achievement (Ivcevic & Brackett, 2015). In reality, we wanted to verify whether repeated evaluations leading to frustration or success impact on individual cognitive and affective resources. We in particular hypothesized that creative frustration and creative success conditions rely on different cognitive (and in particular attentive) and emotional resources and that individual differences in the management of the two affective situations can explain the emerging differences in creative performance.

The Impact of Evaluations on Attentive and Affective Mechanisms Involved in the Creative Thinking Process

Why did we concentrate our scientific interest on the impact of individual differences over attentive and affective resources during the creative process?

First of all, because one of the most important findings in the cognitive study of creativity reveals that less effective attentive filters are associated with better creative outcomes (Carson, Peterson, & Higgins, 2003; Mendelsohn, 1976; Mendelsohn & Lindholm, 1972; Necka, 1999; Peterson, Smith, & Carson, 2002). In particular, the study of breadth of attention (which refers

to the number and range of stimuli attended by an individual at a given time; Kasof, 1997) showed that inferior creative performance is associated to a narrow breadth of attention, which filters out extraneous or irrelevant stimuli from awareness, while superior performance is associated to a wider breadth of attention, which focuses on a larger range of stimuli and allows inputs from apparently irrelevant stimuli. This effect led to assume that a wider breadth of attention might allow a much larger pool of associations during the ideational activity (Simonton, 1988). Further, the ability to attend and process irrelevant information (i.e., *irrelevant processing*) has been recently proposed to be the mechanism that relates Openness (the personality trait that is more frequently associated with creativity; Batey & Furnham, 2006; Feist 1998) with creative performance and creative achievement (Agnoli, Franchin, Rubaltelli, & Corazza, 2015). Moreover, as a key finding for the purpose of our study, attentive mechanisms have also been implicated in the decrease of creative performance as a consequence of repeated stressors, such as repeated evaluations (Byron et al., 2010; Teichner et al., 1963). Because of their stressful and arousing nature, which divert the cognitive resources away from the creative task, evaluations (either positive or negative) can indeed leave fewer resources to the creative task. The stressful nature of repeated evaluations may in particular result, according to Eysenck (1995), in simpler cognitive strategies, such as a narrow attentional focus, which is detrimental to creative performance. This hypothesis by Eysenck could explain the drop in creative performance as a consequence of frequent evaluations, but it cannot explicate why individual differences emerge in creative performance under the same evaluative condition.

In addition, we must take into account that creative frustration and creative success emerging as a consequence of evaluative feedback are situations charged with a deep affective meaning (Beghetto, 2014; Ivcevic & Brackett, 2015). The role of affect must therefore be taken into consideration to explore creative performance under these situations. The approaches exploring the influence of activation (De Dreu, Baas, & Nijstad, 2008) and of regulatory focus on creative performance (Higgins, 1997; Idson, Liberman, & Higgins, 2000) are particularly useful for this purpose. On the one hand, the activation approach states that an activating mood, i.e., an increase in arousal, stimulates creative activity (Baas, De Dreu, & Nijstad, 2012). On the other hand, the regulatory focus approach differentiates on the basis of the motivational drive, suggesting that approach-avoidance behaviors emerge in the creative act as a consequence of a promotion or a prevention motivational focus. Under a promotion focus, people should experience the

desire to continue in the creative activity as a consequence of successful attainments in the task, whereas under a prevention focus, people should feel a dejection-related negative state (e.g., frustration), as a consequence of unsuccessful attainments in the creative task (Higgins, 2006). Both affective arousal and regulatory focus have been demonstrated to be involved in creative performance (Baas, De Dreu, & Nijstad, 2008). Under repeated evaluations, according to the activation hypothesis, the consequent increase in affective arousal should lead to an increase in creative performance. However, according to the regulatory focus theory, an increase in affective arousal should be associated with an increase in creative performance during repeated successes, whereas it should be associated with a decrease in creative performance during failures. Once again, however, these approaches cannot explain why, under identical conditions, differences emerge in creative performance. To understand these nuances, we used an individual differences approach.

Trait Emotional Intelligence: A Key Element to Understand Individual Differences in Creative Performance

We believe that the answer to our research question requires the study of individual differences in the management of creativity-related emotions, highlighting the necessity of a construct that accounts for individual emotional differences in a comprehensive way (Sevdalis, Petrides, & Harvey, 2007). Emotional intelligence (EI) is a psychological construct that has been introduced to study social behavior, and it has been proposed as a new perspective in the study of emotions. In particular, this approach maintains that the intelligent use of emotions is essential to explain both physical and psychological individual adaptations (Extremera & Fernández-Berrocal, 2006). In our work, we decided to focus on trait EI because we were interested in people's stable tendencies in experiencing and managing their emotions. Trait EI is defined as a set of emotional perceptions located at the lowest level of the personality hierarchy (Petrides, Pita, & Konakki, 2007). The concept of trait EI basically proposes that individuals differ in the way they process, use, and manage affect-laden information of an intrapersonal or interpersonal nature (Petrides & Furnham, 2003). Essentially, it recognizes the subjective nature of human emotional experience and is concerned with people's perceptions of their own emotional abilities at both individual and social levels. According to Sevdalis et al. (2007), the concept of trait EI provides comprehensive coverage of the emotion-related self-perceptions that could be directly relevant for the

study of creative behavior. More importantly for the purpose of our work, high trait EI individuals emerged to be more able to deal with negative events (Sevdalis et al., 2007), to manage stress and emotions (Mikolajczak, Petrides, Coumans, & Luminet, 2009) and to increase performance in the face of failures (Agnoli, Pittarello, Hysenbelli, & Rubaltelli, 2015), all elements that should have high impact on creative performance. Moreover, physiological data confirm these results, finding an association between trait EI and affective arousal (Rubaltelli, Agnoli, & Franchin, 2016), and showing that trait EI can moderate the effect of arousal on behavior (Pittarello, Conte, Caserotti, Scrimin, & Rubaltelli, 2017). Trait EI could therefore represent a suitable variable to capture the individual differences in the management of the subjective emotional experience deriving from the comparison with the social norms, which are essential in the evaluation of an idea. It could therefore act as a sort of regulator of the relationship between the individual and the society during the creative process and especially during the evaluative moments characterizing the process.

On the basis of all the above, we expected a moderating role of trait EI on the stressful effect of repeated evaluations leading to a perception of creative success or creative frustration, which should affect both attentive and affective mechanisms during the generative process required by a creative task. Specifically, through better management of the stressful effect of repeated evaluations, we expected that high trait EI individuals would be more able than low trait EI individuals in using complex cognitive strategies, such as the attentive processing of apparently irrelevant information (i.e., irrelevant processing) favorable to creative performance. Moreover, we expected that trait EI could moderate the impact of affective arousal on creative performance especially in the frustration condition. Whereas after repeated positive feedback (in a success condition) both high and low trait EI individuals should increase their creative performance with the increase of affective arousal, after repeated negative evaluations (in a frustration condition) the increase of arousal should be associated with a decrease in performance in low trait EI participants and to an increase of performance in high trait EI participants.

Starting from these hypotheses, our study focused on the effect of repeated evaluations inducing a perceived condition of frustration or success on the generation of original alternative ideas, tested through a visual version of the Unusual Uses Test (UUT; Guilford, 1967), a classical divergent thinking task asking to produce unusual alternative uses for common objects. Specifically, our visual version was composed by settings that contain both relevant (the object for which participants were asked to produce alternative uses) and irrelevant information (random objects apparently unrelated to the task; Agnoli,

Franchin, et al., 2015). Through the use of repeated artificially positive or negative feedback to the outcomes of the task, we elicited frustration or success feelings in participants. Using eye movement tracking, the processing of irrelevant information as well as pupil dilation were measured, monitoring changes in irrelevance processing and affective arousal as a consequence of repeated evaluations. Finally, we measured participants' trait EI, and assessed changes in affective reactions and task motivation to check the efficacy of our experimental manipulation. In the following sections more details regarding the method are provided.

Method

Participants

Fifty undergraduate students (38 females; mean age 22.2 years, *SD* = 1.6) participated in the study. Participants were randomly assigned to one of the two experimental conditions: 27 participants to the positive feedback (success) condition and 23 to the negative feedback (frustration) condition. Since eight participants were excluded from analyses, 42 participants were finally included in the analysis (22 in the success condition, 20 in the frustration condition).

Stimuli and Apparatus

The stimuli used in the UUT task were 15 screens organized as a circle that encloses in the centre a target object (the object for which the participants had to find as many unusual uses as they could) circularly surrounded by 8 different objects. Each target object was surrounded by 8 different peripheral stimuli (see Fig. 15.1).

Participants' eye-movements were measured with a Tobii T120 eye-tracker. The eye-tracker was integrated with a 17″ monitor, where all stimuli were presented using the Tobii Studio software. Nine different fixed non-overlapping areas of interest (AOIs) were drawn around each object for all presented stimuli (see Fig. 15.1). Two measures were derived: the fixation length of peripheral stimuli, as a measure of irrelevance processing (Agnoli, Franchin, et al., 2015), and pupil dilation, as a measure of affective arousal (Bradley, Miccoli, Escrig, & Lang, 2008; Partala & Surakka, 2003; Rubaltelli et al., 2016).

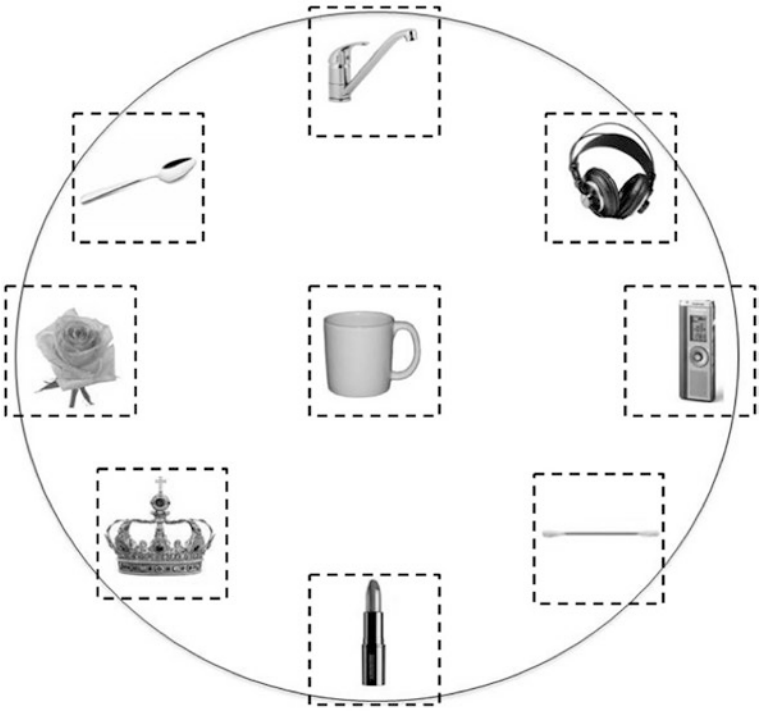

Fig. 15.1 An example of a stimulus with the target object in the center and the 8 different peripheral objects next to the circumference. Dashed squares correspond to the area of interest for each stimulus

Trait EI and Affective States Measurement

Affective and motivational changes deriving from the experimental manipulation as well as trait EI were measured through self-report questionnaires. Trait EI was measured through the TEIQue-SF questionnaire (Petrides & Furnham, 2006). This 30-item scale measures trait emotional intelligence using a seven-point scale ranging from 1 ("completely disagree") to 7 ("completely agree"). The items ask to self-report one's ability in regulating, expressing, and perceiving emotions. Items in the TEIQue-SF include sentences such as: "Expressing my emotions with words is not a problem for me", or "On the whole, I'm pleased with my life". The scale showed good reliability: $\alpha = 0.78$. Changes in affective states were measured through the PANAS-X scale (Watson & Clark, 1999). This 60-item scale consists of a number of words that describe different feelings. Participants rated the intensity of the feelings they experienced on a 5-point scale ranging from 1 (very slightly) to 5 (extremely). For the purpose of the study, we used only 33 items, measuring hostility, fatigue, sadness, jovi-

ality, self-assurance, and attentiveness affect. The reliability of the scale was good ($\alpha > 0.68$). Finally, changes in the motivation in the task were measured through the Questionnaire on Current Motivation – Short Form (QCM; Freund, Kuhn, & Holling, 2011). This 12-item scale is a measure of task motivation and it assesses four factors of current achievement motivation (anxiety, challenge, interest, and probability of success). For the purposes of our study, only the interest in the task and probability of success factors were measured on 7-point rating scales, with the labels "completely disagree" at 1 and "completely agree" at 7. Exemplary items for the interest in the task and probability of success factors, respectively, were "I would work on this task even in my free time" and "I think I am up to the difficulty of this task". Reliability of the probability of success subscale was lower than for the other two instruments but still acceptable (interest, $\alpha > 0.68$; probability of success, $\alpha > 0.61$).

Procedure

We used a cover story to make our experimental manipulation more realistic. Participants were told that the aim of the study was to test a new automated algorithm that in real time would be able to evaluate the creativity of their responses. They were instructed to produce as many possible creative uses as they could for the objects they saw at the centre of the screen (target objects). They had to say their answers loudly in order to allow the experimenter to transcribe their responses in a software, within which the algorithm would have scored the creativity of their answers. Upon arriving in the laboratory, participants were asked to answer the PANAS-X questionnaire (Watson & Clark, 1999) in order to evaluate the intensity of their feelings before the beginning of the experimental session. Moreover, after the initial briefing, participants were asked to answer the QCM questionnaire (Freund et al., 2011), in order to measure their perceived probability of success and interest in the task before the beginning of the experiment.

First of all, participants were presented with an example trial. They were informed that before the appearance of the target object, a fixation cross would appear (for 2 seconds) at the centre of the screen. They had to fixate this cross and the target object would have appeared in its correspondence. Moreover, they were informed that the target object would be surrounded by other objects, which they could decide to look at or not (see Fig. 15.1), but that their task was related only to the production of creative uses for the central object. Participants could look at the target object for as long as they wanted. Once ready to answer, they could press the space key, then a blank

screen appeared and they had 30 seconds to produce all creative uses for the target object they could think of. They were then presented with five different blocks containing three different target stimuli each.

Two experimental conditions were manipulated between subjects: in the negative feedback condition, participants constantly received the same feedback at the end of each of the five blocks: "The creativity of your responses is *LOW*"; in the positive feedback condition, instead, participants constantly received the following feedback: "The creativity of your responses is *HIGH*". In both conditions, feedback presentation (for 10 seconds) at the end of each block was preceded by the slide "End of the block. The computer is calculating the creativity of your responses" for 10 seconds to inform participants that their results were being computed by the algorithm.

It is important to underline that although the participants' performance was real, the feedback provided was artificial: it did not reflect their actual performance and was adopted solely to manipulate the different experimental conditions. At the end of each block, participants in both conditions were asked to complete again the PANAS-X scale, rating the intensity of the feelings they were experiencing at the present moment, and the QCM, rating probability of success and interest in the task at the present moment. Finally, at the end of the computer task, TEIQue-SF was completed by participants. At the end of the experiment, as a manipulation check, participants were asked to explain which was, in their opinion, the purpose of the study. Participants who reported they had understood the experimental manipulation were excluded from the analysis (see participants section).

Originality and fluency of the responses given by each participant were calculated off-line. Participants generated a total of 2352 responses. Three independent expert raters evaluated the originality of each response to each target object. Raters scored responses originality following procedure by Silvia et al. (2008); each response in particular received a rating on a 1 (not at all original) to 5 (highly original) scale. According to this scoring procedure, creative responses should be uncommon, remote, and clever, and all these three dimensions should be considered in originality evaluation (see Silvia et al., 2008; Wilson, Guilford, & Christensen, 1953). Interrater reliability resulted to be good (Cohen's $\kappa > 0.62$).

Results and Discussion

As a first preliminary finding, results revealed the effectiveness of our experimental manipulation, showing that the two evaluative conditions impacted differently on participants' affective states and motivation. Two different

emotional conditions were indeed generated through the manipulation, with a decrease in the perceived probability of success and interest in the task and a reduction of positive affective states in the negative feedback condition (frustration) as compared to the positive feedback condition (success). Moreover, a progressive increase of arousal (as measured through pupil dilation) with the repetition of feedback emerged, in line with past research showing the arousing and stressful nature of repeated evaluations (Byron et al., 2010).

More importantly for the purpose of our research, eye-tracking results confirmed that evaluation is a stressful event having an impact on creative performance (Byron et al., 2010). In line with our hypothesis, in particular, the stressful effect of evaluation emerged through its influence on attentive processing. Since our interest was mainly directed to understanding the differences emerging in creative performance under the same evaluative context, it is essential to note that trait EI emerged as central in explaining the extent of this impact. We indeed found that in low trait EI individuals the length of observation of irrelevant information (irrelevance processing) was associated to a decrease of creative performance, both in the number (fluency) and in the originality of participants' responses. This effect emerged after the first evaluation in originality (Fig. 15.2); whereas before the first feedback high and low trait EI participants did not diverge, in low trait EI participants a negative associative trend between irrelevance processing and creative performance appeared after the first evaluation. Figure 15.2 represents the relationship between length of observation of peripheral irrelevant stimuli and originality in low and high trait EI participants in the five experimental blocks. The first block could ideally represent the beginning of an ideational activity, when no evaluation of the generative activity has yet been performed. In this situation,

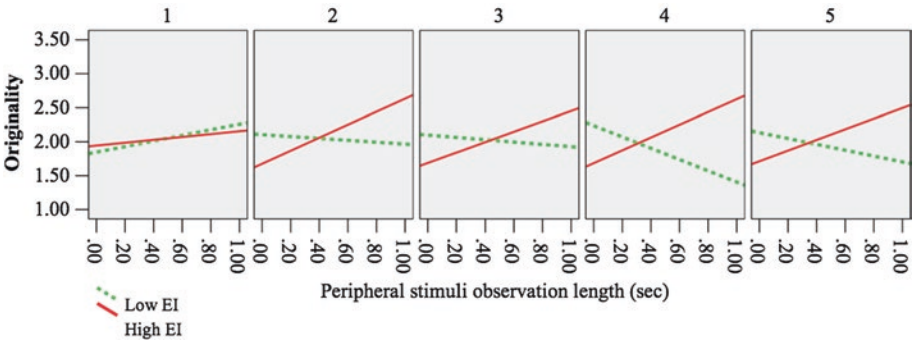

Fig. 15.2 Relationship between irrelevance processing (fixation length of peripheral stimuli) and originality in low trait EI (dotted line) and high trait EI (continuous line) participants in the five task blocks

individual differences in the emotional domain (trait EI) do not highlight any difference between participants in the attentional behavior during the creative task. Only after the first evaluation (which was delivered at the end of the first block), individual differences in the emotional domain can explain the differences emerging in the association between attentional behavior and creative performance. With the repetition of evaluation, the processing of irrelevant information assumed indeed a different role for creative performance according to the individual level of emotional intelligence.

This finding suggests, on the one hand, that irrelevant information become distractors for people overwhelmed by the stressful nature of the evaluations (i.e., low trait EI individuals). As hypothesized by Eysenck (1995), we can assume that all elements outside the immediate focus of the attention (i.e., irrelevant information) could be considered in this situation as taking away resources from the task. On the other hand, in high trait EI participants a positive association between the length of observation of irrelevant information (irrelevance processing) and creative performance emerged, in line with past research on the benefit of irrelevance information on creative thinking (Agnoli, Franchin, et al. 2015; Carson et al., 2003; Kasof, 1997). In this case, irrelevance information did not take cognitive resources away from the thinking process, but it is instead used to obtain a larger pool of associations during ideational activities (Simonton, 1988).

The results emerging form this study highlighted therefore that the attentive processing is particularly sensitive to evaluation, whatever the nature of the evaluative feedback. The stressful nature of evaluation emerged in both the success and frustration conditions, with a generalized detrimental effect on creative performance for people without sufficient emotional resources. Unlike the attentional processing, arousal emerged to be instead particularly sensitive to the nature of the evaluative feedback. Results on affective arousal revealed indeed clear differences between success and frustration (Fig. 15.3).

As depicted in Fig. 15.3, under success, originality increased with the increase of affective arousal, irrespective of participants' trait EI level. Interpreting this result according to the regulatory focus theory (Higgins, 1997; Idson et al., 2000), we can infer that, under success, creative behavior is driven by a promotion focus, whereby people experience a successful satisfaction of their creative drives. Arousal is therefore used to promote original creative behaviors. On the contrary, under frustration, the emerging motivational attitude should prevent from attending the task, in the attempt to avoid repeated dejection-related negative states and in particular repeated negative evaluations of the creative activity. Critically, this trend emerged in low trait EI participants, who showed a creative performance decrease with the increase

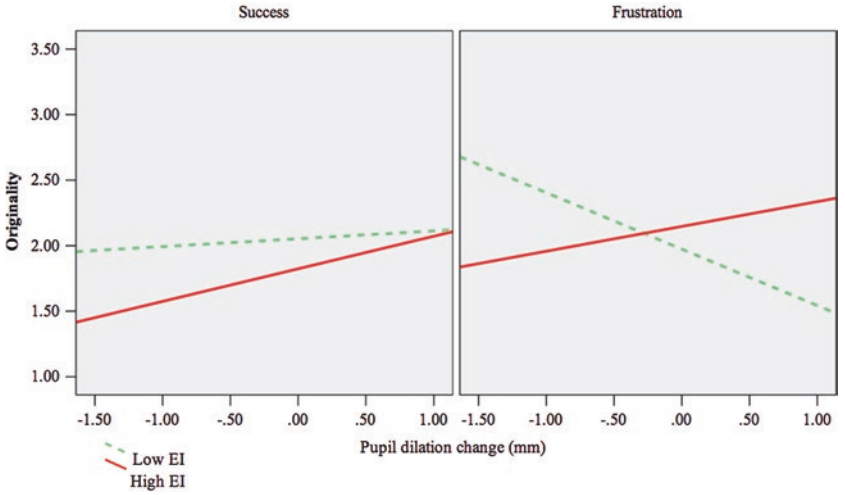

Fig. 15.3 Relationship between affective arousal (pupil dilation change) and originality in low trait EI (dotted line) and high trait EI (continuous line) participants in the success (left panel) and in the frustration (right panel) condition

of affective arousal in the frustration condition. On the contrary, under the same situation high trait EI participants showed an increase of originality, exhibiting a promotional attitude towards the creative task. According to these results, trait EI allows a better management of the affective impact of negative evaluations. Irrespective to the nature of the feedback, high trait EI participants were able to use the energy provided by the emotional situations to promote and increase their creative performance. These findings can be interpreted in the light of a recent proposal on the role of emotions for the creative thinking process, which states that emotions are the spinal cord of this process and that changes in emotional energy are able to drive the entire process towards the generation of new and effective ideas (Agnoli & Corazza, in press).

Conclusions

The ability to face evaluation is a key element in the creative process. The comparison with the social and cultural norms defining the originality and effectiveness of a creative product is indeed a necessary condition for a successful creative process. Resisting the frustration deriving from negative evaluations as well as managing the stressful nature of repeated evaluations (Byron et al., 2010) have been already demonstrated to be central to achieve in the

creative activity. However, what does it mean "resisting frustration" from a cognitive and affective point of view? Moreover, which psychological mechanisms and personality attitudes can explain the different creative performance emerging as a consequence of evaluation deriving from the external environment? The study described in the present chapter tried to answer to these questions.

The results emerging from our research highlight the central role of trait EI, a specific lower-order personality trait, in the management of attentive and affective resources under frustration and success conditions, determining people's creative performance. The effect of this personality trait on creative performance has been here explained through its interaction with attentive and affective behaviors previously related to creativity. First of all, the results showed that trait EI, by its ability to counteract the detrimental effect of stressful events such as repeated evaluations (Mikolajczak et al., 2009), allows to use more adaptively the attentional resources beneficial to creativity. High trait EI individuals resulted indeed to be able to maintain a wider breadth of attention, which allows to exploit the potential beneficial effect of irrelevant information on the creative behavior (Agnoli, Franchin, et al., 2015). Without the buffering effect of trait EI, evaluation emerged to be, instead, a highly stressful event, which influence must be counteracted through the use of simpler cognitive strategies, such as the narrowing of the focus of attention. Moreover, trait EI emerged to be able to manage also the motivational drive primed by positive and negative evaluations. The impact of trait EI, in particular, emerged to be discriminant in the critical evaluative condition leading to creative frustration. Repeated negative feedback on the creative activity prime indeed a tendency to avoid arousing negative states as a consequence of negative evaluations. Under this situation, high trait EI participants were able to restructure the avoiding nature of this motivational drive and exploit the arousing potential of the situation to increase their ability to produce original responses, in line with results showing the protective role of trait EI from negative feedback (Agnoli, Pittarello, et al., 2015).

In conclusion, trait EI emerged as a cornerstone in unraveling the individual differences emerging in creative performance under the same evaluative context. High trait EI individuals appeared to be sheltered from the narrowing of attention resulting from stressful repeated evaluations and from the overwhelming affective arousal stemming from repeated failures. Does it mean that we found the mechanism that can explain individual differences in creative performance? No, we did not in absolute terms, but only in relation

to specific evaluative contexts. We tried to solve one piece of the overall puzzle that forms the complex field of the individual differences emerging in the complex interaction between the creative behavior and the social environment. We did it through an emotion-driven point of view, which interprets the creative process as a system controlled and driven by the emotional experience, thus offering a new perspective on the phenomenon of evaluation during the creative process.

Creative behavior emerged to be part of a complex interactive process between the individual and the environment. This interaction appears evident during the generative phase of the process, when the introduction of apparently irrelevant information cues from the environment allows a reorganization of the information structure leading to more original ideas. This effect emerged in the study described in the present chapter as well as in studies highlighting the role of mind-wandering for the generation of original ideas (Agnoli, Vannucci, Pelagatti, & Corazza, 2018; Baird et al., 2012). However, the individual's environment emerged to be even more central during the evaluative moments distributed along the process. During these moments, the environment brings into the process the social evaluative norms defining a creative product. These social norms can be expressed as internalized criteria adopted during the personal evaluation of the idea or, as in the case explored in the present study, as external evaluations of the outcome of the generative process. Our study shows that the comparison with the norms, in the form of evaluations of the creative products, brings into the process an arousal level that could be beneficial or detrimental to the process itself. Individual differences in the managing of the affective arousal deriving from this comparison emerged to be essential to distinguish between a successful and an inconclusive process. The ability to regulate and manage the emotional reactions elicited by the comparison with the social context results to be therefore essential in a creative process. This finding may potentially have a deep impact also on educational practices. The frustration deriving from the comparison with the external audience is indeed one of the first causes for disinvestment in creative activities. If we recognize that the comparison with the social norms produces an emotion-laden creative process, we should give to the young generations the instruments to manage their emotional experiences in order to take benefit from them during the creative process. Educating to the intelligent use of the emotional experiences rising during the creative process may finally result in higher willingness to take the risk and to cope with the frustration deriving from a creative act.

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16

Divergent and Convergent Collaborative Creativity

Paul B. Paulus, Lauren E. Coursey, and Jared B. Kenworthy

Much creative activity happens in groups. Many domains such as science, the arts, technology, marketing, and government involve collaborative discussions to generate ideas for solutions to problems. Potentially these discussions can lead to novel ideas and solutions as participants share ideas, are stimulated to think of new ideas, and build on the shared ideas. People typically enjoy these discussions and perceive them to be effective (Paulus, Dzindolet, Poletes, & Camacho, 1993). Information exchange in teams is associated with perceptions of enhanced creativity (Hülsheger, Anderson, & Salgado, 2009). Further, perceptions of team creativity tend to be greater in contexts where team members feel psychological safety, mutual trust, and cultural support (West, 2003).

Although the team literature provides some support for the creative benefits of collaborative innovation, most of the studies have used self- and other-reports of creativity. These may reflect reality to some extent, but studies have found that self-reports are often an unreliable measure of creativity (Paulus et al., 1993; Reiter-Palmon, Robinson-Morral, Kaufman, & Santo, 2012). Most research with more objective measures of performance have been limited to controlled studies of temporary groups in laboratory settings. These studies allow for detailed measures of performance and testing of theory-based hypotheses. This research and the related theoretical models provide a strong basis for the practice of collaborative innovation in real world settings and

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some of the major findings appear consistent with those of the team innovation literature (Paulus, Dzindolet, & Kohn, 2012).

However, much of the past research has focused almost exclusively on group brainstorming and divergent processes that contribute to idea generation (Cropley, 2006; McMahon, Ruggeri, Kämmer, & Katsikopoulos, 2016). Although divergent ideation is integral to creativity, real-world innovation often requires the type of convergent synthesis rarely studied in laboratory groups (Harvey, 2014). Innovative groups are often tasked with not only generating novel ideas, but also idea evaluation and selection, elaboration and development of ideas, and finally idea implementation. In this chapter our major focus will be to highlight both divergent and convergent thinking processes in groups and the relationship between the divergent ideation phase and the convergent phase of developing a specific innovation. There has been much research on divergent creativity, some on convergent creativity but little on the link between divergent and convergent creativity (e.g., de Vries & Lubart, 2017). We will provide brief reviews of the major findings on divergent and convergent creativity in groups and present some recent research findings on the connection between divergent and convergent creativity in groups.

Divergent Creativity in Groups

Divergent processes are those that involve the exploration of diverse categories of information, generation of remote associations, and creation of new solutions (Harvey, 2014). Guilford (1967) suggested that fluency (number of ideas), flexibility (variety of ideas), originality, and idea elaboration should be considered as four major categories of divergent thinking. This approach has been commonly accepted in the field (Baer, 1993), and we have also focused on these categories in our work (e.g., Deuja, Kohn, Paulus, & Korde, 2014). A major interest in laboratory-based group creativity research has been determining the factors which enhance the production of ideas and categories of ideas. Two models of group creativity form the basis for much of this research: Brown and Paulus' (Paulus & Brown, 2003, 2007) cognitive motivational model of group creativity and the Search for Ideas in Associative Memory model (SIAM) (Nijstad, Diehl & Stroebe, 2003; Nijstad & Stroebe, 2006). These models both assume that individuals will systematically search their memory for ideas to share with the group. More accessible ideas are tapped first and a search process proceeds according to semantic similarity. Thus, there is a tendency for individuals to generate ideas within particular catego-

ries or domains until it becomes difficult to generate new, semantically-related ideas. Then, the focus shifts to new categories or domains. Because more common or accessible categories or ideas are tapped first, it is likely that the most novel ideas occur toward the end of the idea generation session.

A broad range of studies has assessed hypotheses related to these models. For example, exposure to a larger number of ideas increases the generation of ideas (Dugosh & Paulus, 2005; Dugosh, Paulus, Roland, & Yang, 2000; Nijstad, Stroebe, & Lodewijkx, 2002; Paulus, Kohn, Arditti, & Korde, 2013). Exposure to a more diverse set of ideas also increases idea generation (e.g., Nijstad et al., 2002). These findings are consistent with the assumption that exposure to ideas will lead to semantic associations that will stimulate further ideas. Other work shows that focusing on one category at a time increases idea generation, compared to being exposed to all categories at once (Coskun, Paulus, Brown, & Sherwood, 2000; Dennis, Valacich, Connolly, & Wynne, 1996), presumably because the former encourages participants to more fully tap ideas within each category. Focusing on a limited set of categories also increases the novelty of generated ideas because of a greater chance of deeper exploration within categories (Rietzschel, Nijstad, & Stroebe, 2007).

The theoretical models and related findings suggest that groups have much creativity potential. Through providing a larger, and at times diverse, pool of informational resources, groups may be better equipped to generate novel solutions to problems. However, early findings on group creativity or brainstorming revealed that, contrary to popular expectations, group brainstorming – in which ideas are shared verbally – is not very effective. Indeed, interactive groups are typically less productive than a similar number of individuals (nominal groups; see Diehl & Stroebe, 1987; Mullen, Johnson, & Salas, 1991). The larger the group, the greater the discrepancy in performance (Bouchard & Hare, 1970). A major reason appears to be production blocking, or the inability to express ideas as they occur because of the need to share speaking time with other group members (Diehl & Stroebe, 1987; Nijstad & Stroebe, 2006).

Social loafing and evaluation apprehension may also be contributing factors to comparatively poor group performance (Camacho & Paulus, 1995; Diehl & Stroebe, 1987). Performance in groups is typically not equally distributed, with one or two people often dominating the discussion. Other group members may "free ride" on the efforts of active members because they do not perceive their efforts to be needed (Kerr & Bruun, 1983). Alternatively, group members in general may have lower motivation to exert effort if their performance is not identifiable or easily distinguished (Karau & Williams, 1993). Increasing accountability for performance or inducing competition

can enhance group performance (Paulus, Larey, Putman, Leggett, & Roland, 1996). Furthermore, there is a tendency of group members to match their performance with the low performers in the group (Paulus & Dzindolet, 1993). One solution is to focus on individual idea generation if the generation of a large number of ideas is wanted. However, group creativity efforts are frequently required in real-world settings and people must work together to solve problems. Thus, it is important to discover how to optimize such collaborations. These research efforts have often focused on computer-based or writing-based approaches.

Studies of idea exchange using written notes and electronic methods have shown them to be effective techniques (Dennis, Minas, & Williams, in press; DeRosa, Smith, & Hantula, 2007; Paulus, Korde, Dickson, Carmeli, & Cohen-Meitar, 2015; Paulus & Yang, 2000). These techniques avoid the problem of production blocking; participants can share ideas as they occur. They may also reduce evaluation apprehension when each person's individual contributions are less identifiable. Using these methods, group performance can exceed that of nominal groups, suggesting the synergistic potential of creative groups (DeRosa et al., 2007). The best approach may be to alternate group and individual ideation sessions (Korde & Paulus, 2016). Individual sessions which follow group sessions show an elevation in the number of ideas generated, suggesting carry-over of cognitive stimulation from the group session. Studies have also shown that brief breaks in the individual brainstorming process can be beneficial (Paulus, Nakui, Putman, & Brown, 2006). These breaks allow individuals to overcome fixation on a limited range of ideas and to rehearse or reflect on the shared ideas.

In addition to timing and structure, brainstorming groups may benefit from clear rules. Groups without clear rules for brainstorming tend not to function effectively. Osborn (1953) – the original promoter of brainstorming – suggested that certain rules can increase the extent to which individuals feel free to express their ideas. Group members were told to not evaluate or criticize ideas and to say whatever came to mind. Osborn encouraged a focus on quantity, rather than quality, and encouraged building on others' ideas. The use of these rules has been shown to enhance performance (Meadow, Parnes, & Reese, 1959). Adding a rule to keep the expression of ideas efficient (e.g., by not elaborating or telling stories) can also increase the number of ideas generated substantially (Putman & Paulus, 2009). However, there has not been systematic research on the relative importance of these different rules. Although emphasizing quantity of ideas increases both the number of ideas and number of good ideas compared to an emphasis on quality, or both quantity and quality (Paulus, Kohn, & Arditti, 2011), evidence for the benefit

of the 'do not criticize' rule is mixed. Some studies have demonstrated negative effects of evaluation concerns (Camacho & Paulus, 1995; Diehl & Stroebe, 1987), but others have found that critical feedback during brainstorming is not detrimental (Nemeth & Ormiston, 2007; Valacich & Schwenk, 1985).

In sum, considerable research suggests clear ways to enhance the number of ideas generated in groups (see also Paulus & Kenworthy, in press), and a corollary is that increasing the number of ideas also increases the number of good ideas (both novel and feasible; e.g., Paulus et al., 2011). There has been little evidence that group interaction increases the average novelty of ideas. However, there has been some evidence that idea sharing in diverse groups can lead to ideas of higher average novelty (Nakui, Paulus, & van der Zee, 2011; van Dijk, van Engen, & van Knippenberg, 2012). Of course, the ultimate aim of most collaborative creativity efforts is to generate high quality ideas – ones that are both novel and feasible – and to use these as a basis for developing an innovation or novel product. This requires shifting from a divergent thinking process to a convergent process of coming up with a specific solution.

Convergent Creativity

Although creativity is often equated with divergent thinking, convergent processes are also important (Cropley, 2006). A number of scholars have emphasized the importance of an evaluation stage after the divergent ideation stage (e.g., Lonergan, Scott, & Mumford, 2004; Runco, 2003). Others have emphasized a range of phases (Basadur & Gelade, 2006; Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Reiter-Palmon & Robinson, 2009; Wallas, 1926). Although Osborn (1953) is most famous for the divergent brainstorming process, he and his disciples emphasized the different phases of the creative process: finding the facts, defining the problem, ideation, solution-finding and acceptance.

Research on convergent creativity in groups has been sparse. Convergent creativity has been conceptualized in a number of different ways. Larey and Paulus (1999) focused on the degree of divergence and convergence in the idea generation stage. Convergence was measured by examining how much groups focused on ideas in a specific category at one time. Harvey and Kou (2013) similarly evaluated in detail the divergent and convergent processes in the idea generation processes of four healthcare policy groups. During idea generation, evaluation of ideas tends to naturally occur. This may facilitate a

focus on the more promising ideas. Harvey (2013) points out that convergent creativity occurs in the idea generation stage as participants build on each other's ideas. She distinguishes this type of convergent process from idea selection (Cropley, 2006), or from selecting from a range of alternatives as in the decision-making domain (Stasser & Abele, in press). Kerr and Murthy (2004) compared divergent and convergent idea generation between computer-mediated and face-to-face groups and found that computer-mediated groups generated more ideas than did face-to-face groups, but in the convergent phase computer-mediated groups recommended both more relevant and irrelevant ideas. Kerr and Murthy (2004) suggest that face-to-face interaction facilitates feedback and is useful for eliminating irrelevant suggestions.

In coming to a consensus about a final product, participants need to select the best ideas based on their evaluations. In general, participants are not particularly good at this. A number of studies have shown that groups perform at about a chance level in picking the ideas that trained coders identify as novel (Putman & Paulus, 2009; Rietzschel, Nijstad, & Stroebe, 2006). People have a bias to select more feasible ideas, consistent with a noted general aversion to novel ideas (Mueller, Melwani, & Goncalo, 2012). Thus, the existing literature suggests that it is difficult for a group's best ideas to survive from the divergent stage into a final implementation stage.

One problem with the convergent process of evaluating, analyzing, and organizing a group's ideas is the experience of cognitive overload (Kolfschoten & Brazier, 2013), which occurs when a large number of ideas are shared and the task requires developing a shared understanding, reducing redundancy, and creating an overview by looking for relations among the contributions. De Vreede and colleagues promote the use of structured approaches such as Thinklets, which provide detailed scripts for how to conduct various aspects of the convergence process (e.g., de Vreede, Briggs, & Kolfschoten, 2006). They have conducted many workshops using these techniques, but there has not been a systematic evaluation of their effectiveness in selecting the best solutions. Of course, in most collaborative settings, the process is neither structured nor facilitated. Groups simply come together to share ideas in meetings or brainstorming sessions and then try to come to a consensus about the best option or alternative.

Linking Divergent and Convergent Creativity

The research and theory on divergent creativity in groups has provided some basis for understanding the flow of ideas among group members as they build on or react to shared ideas. Research on divergent group creativity finds that

idea flow is influenced by semantic similarity (e.g., Dugosh & Paulus, 2005). Therefore, it is not surprising that many studies have shown that more common stimuli have more stimulation value. Moreover, as noted earlier, idea generation should focus on a single category or domain at a time; the clustering of ideas generated within the same category is related to enhanced idea generation (Baruah & Paulus, 2011). This seems somewhat contrary to the notion that inspiring creativity requires exposure to radically new or novel ideas. However, radical ideas may not overlap with the recipients' semantic networks and may consequently have minimal associative potential.

Brainstorming groups are prone to both cognitive and social convergence. Larey and Paulus (1999) proposed that the tendency toward "semantic convergence" during a divergent thinking stage would be exacerbated in a group brainstorming context. Social influence in groups also leads to a convergence in performance (Paulus & Dzindolet, 1993) and a focus on agreement or common information (Stasser & Abele, in press). Larey and Paulus (1999) suggested this convergence tendency should be stronger for those with a positive attitude to working in groups, and they indeed found that group brainstorming was characterized by a tendency to focus on a single issue for a longer period of time, compared to nominal groups. This was especially the case for those who enjoy working in groups.

Although the generation of a large number of ideas in a divergent stage is seen as a positive goal in brainstorming, in most real-world settings the focus is on selecting the best ideas and then developing one or more of those ideas into a final product. As we indicated earlier there is a bias toward ideas that are feasible (Putman & Paulus, 2009; Rietzschel et al., 2006). Thus it is likely that group members will not further develop the most novel ideas to create final products. In support of this, Glăveanu, Gillespi and Karwowski (in press) found that dyads working together on a divergent thinking task showed a preference for practical ideas. Several studies have examined the process of building on already-generated ideas. Using the brainwriting method, Kohn, Paulus, and Choi (2011) asked participants to build on ideas generated previously by other students. They were presented with either common ideas or unique ideas based on their prior normative frequency. Nominal groups generated more ideas than did interactive groups. However, interactive groups exposed to rare (but not to common) ideas generated combinations of higher novelty and feasibility than did nominal groups. This is somewhat surprising because exposure to common ideas typically stimulates more novelty than does exposure to unique ideas (see Dugosh & Paulus, 2005). However, group interaction may allow for a sharing of diverse ways to make unique ideas both feasible and more novel. McMahon et al. (2016) examined the extent to

which groups could enhance a specific idea. Among interactive groups, the resultant embellished ideas were rated higher along various dimensions (e.g., marketability) compared to those of nominal groups. Apparently the group interaction process involved a discussion of a wider range of topics when compared to the nominal condition. Groups have an advantage over individuals in the building process because they can share diverse perspectives to enhance ideas. Lonergan et al. (2004) suggest that the group's orientation to the building process is important. They asked students to evaluate and revise ideas that had been generated for a marketing campaign, with instructions to focus either on efficiency of the current process or on generating new ideas. Better quality plans were developed with a generative orientation for less original ideas, but with an efficiency orientation for more original ideas. Thus, the specific goal for groups should be tailored to the task itself. Of course in most cases one would want to build on novel ideas to make them more feasible. However, given the bias in favor of feasible ideas it is important to also make those more novel.

The sequence of alone and group sessions may also be important. Putman and Paulus (2009) found that those who had brainstormed alone were better able to discern the best ideas during a subsequent group discussion than were those who had brainstormed those ideas as a group. Girotra, Terwiesch, and Ulrich (2010) found that those with an alone-then-group sequence (compared to group-only) generated higher quality ideas and were better able to judge the quality of the best ideas. Apparently, generating one's own ideas first provides a useful reference point for subsequent idea evaluation because it provides a cognitive contrast between one's own ideas and those of the group. More novel ideas may become more salient in the alone-then-group sequence.

Very few studies have examined the development of a final group product in relation to a prior idea generation phase. A key issue here is the degree to which the processes of idea sharing and elaboration influence the final product. Given the general bias against the most novel ideas, we expect that such ideas might get less attention during the idea sharing process in terms of replying to or building on them. Ideas receiving replies from others are more likely to become salient in the group, and then to be included in a convergent discussion and final product decision. Furthermore, the novelty of those replies should have a greater impact on the final product because of their salience. Reply novelty suggests greater engagement in the process and commitment to improving the specific shared ideas as the group builds toward a convergent solution.

The diversity of the group members should also be an important factor on both divergent and convergent processes. The research on the benefits of

diversity on collaborative creativity has been rather mixed (see Paulus, van der Zee, & Kenworthy, in press, for a review). Differences in background, experience, and knowledge should increase the creative potential of groups. However, diversity can be related to intellectual gaps that make communication more difficult (Cronin & Weingart, 2007) and interpersonal differences may reduce interest in interaction. Thus, research has generally found negative effects or little benefit of demographic diversity, but some benefit of intellectual or cognitive diversity (van Dijk et al., 2012).

We investigated the joint role of divergent and convergent processes in two studies that used a "naturalistic" approach to collaborative creativity. In one study by Coursey, Williams, Kenworthy, Paulus, and Doboli (in press) participants generated ideas using an electronic discussion board which allowed participants to generate ideas, vote for ideas, and elaborate on ideas. This methodology allowed both for divergent and convergent processes similar to the approach suggested by Harvey and Kou (2013). Groups of five generated ideas for improving the U.S. health care system in three 30-minute sessions over a period of four weeks. The idea generation process was done asynchronously in that participants reported individually to the lab to read ideas posted by prior participants in their group, and to add their ideas and replies or elaborations. The goal of this study was to examine the impact of group member diversity on the interaction process and the resultant number and novelty of ideas generated. We obtained information on gender, race/ethnicity, age, and political orientation (liberal, conservative, independent, etc.). Interestingly, age diversity was related to lower levels of creativity, but political diversity was related to a higher level of creativity even though participants were not aware of the characteristics of their group members.

An analysis of the interaction process revealed that the extent to which participants replied to or elaborated on the shared ideas was a factor in these outcomes. For example, political diversity was positively related to the number of replies, while age diversity and ethnic diversity were negatively related to the number of replies. The number of replies was in turn related to increased novelty of ideas. Thus, the convergent process of replying or elaborating on shared ideas, not the number of ideas generated, was a critical factor in predicting the novelty of the ideas. The number of replies may reflect increased engagement in the process which could be related to deeper levels of information processing and higher novelty as a result. Alternatively, the mixing of idea generation and evaluation or elaboration may be optimal for the development of novel ideas (Harvey & Kou, 2013).

In another study we examined the role of the divergent ideation process on the development of a new product (Coursey, Gertner, et al. 2018). Over three

separate sessions, groups of four generated ideas for a new sport. They first generated ideas individually for 30 minutes. In a second session, they individually read the ideas of the group, voted for the best ideas, and then were asked to elaborate on the shared ideas and to generate additional ideas. In a third session, they read the ideas from the second session, voted on them, and then were connected via audio Skype to decide upon a final sport. The groups were constituted based on their expressed expertise or interest in sports. One set of groups consisted of all high expertise members, another all low expertise, and one of mixed low and high expertise. Interestingly, the low expertise groups generated more ideas and more novel ideas compared to the mixed expertise group. These results are consistent with other studies that demonstrate the negative effects of expertise diversity on group creativity (Cronin & Weingart, 2007).

Of most interest to our focus on the relation of divergent to convergent processes was the link between the elaboration phase and the final sport development phase. The only factor that predicted the novelty of the final sport was the novelty of the elaborations in the second phase. The number of elaborations in this phase was related to the novelty of the elaborations in this phase and the novelty of the final sport. The number of ideas generated in the second phase was related to increased novelty of ideas but not the novelty of the final product. Again, the elaboration process, not the overall activity level, was the critical factor because the elaboration process may reflect a high degree of engagement and deeper level of information processing in the group. As a result there should be a higher level of shared consensus about which ideas had the most potential or value. The fact that the most novel ideas did not predict the final outcome is consistent with prior research suggesting a bias away from the most novel ideas to more feasible ones. Participants did, however, recognize the most novel ideas because novel ideas received more votes. Group members may have focused their elaborations on more feasible ideas and how to make them more novel (cf., Lonergan et al., 2004).

In future research we may want to have participants explicitly address and build on the more novel ideas during the exchange process, as was done by Kohn et al. (2011) and Lonergan et al. (2004). For example, Kohn et al. (2011) found that interactive groups were able to build effectively on novel ideas to come up with ideas that were both novel and feasible. Doing this in real time would require some type of computer-aided semantic analysis system for novelty. Alternatively, the participants could be asked to build on the ideas that they voted as most novel in a subsequent session. Cognitive overload of the number of ideas shared may also be a factor limiting the impact of the most novel ideas. Possibly, having a set of short divergence and convergence

sessions, followed by a final decision-making session, might be another way to minimize the overload issue.

Conclusions and a Research Framework

The research on divergent creativity has discovered many ways to increase the number of creative ideas and number of good ideas. However, our research suggests that, at least in unstructured naturalistic settings, groups may not effectively tap this wealth of ideas. Groups tend to be poor at selecting the best ideas, and our research has shown that the number and novelty of the ideas may not influence the final product. Of course, more research is needed to determine the generality of this problem. The key factor seems to be the extent to which participants elaborate on the shared ideas. We have also suggested some ways in which the group interaction can be structured to enhance the potential that highly novel ideas will be elaborated and made more feasible so they will more likely become part of a final creative product. Future research might also examine the role of individual differences. For example Fürst, Ghisletta, and Lubart (2016) found that different personality profiles are related to divergent and convergent thinking. Plasticity, which involves openness to experience and extraversion is related to more divergent thinking or idea generation. A convergent set of ambition, critical sense, precision and persistence predict better selection (evaluation and selection of the best ideas) (Fürst et al., 2016). Thus for tasks that require both divergent and convergent thinking, having group members who vary in these personality dimensions might be helpful.

In Fig. 16.1 we provide an outline of some of the factors we believe are important in both divergent and convergent creativity, and the links between them.

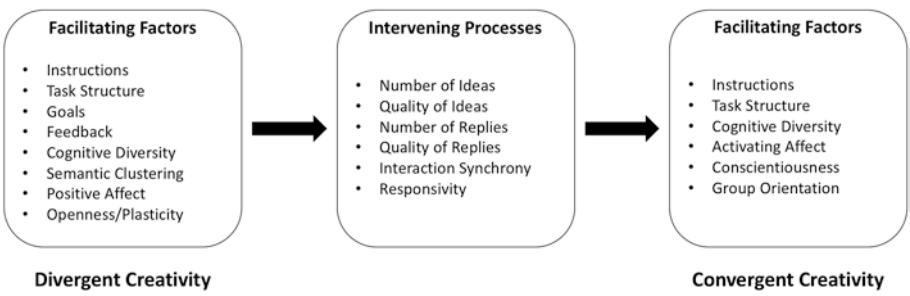

Fig. 16.1 A theoretical model of factors facilitating divergent and convergent collaborative creativity, including intervening processes linking divergent and divergent creativity

There is considerable evidence for the role of factors that influence divergent collaborative creativity as we have summarized in this and prior chapters (Coursey, Paulus, Kenworthy, & Williams, in press; Paulus & Coskun, 2013; Paulus & Kenworthy, 2017, in press; Paulus et al., in press). Thus research has demonstrated the importance of appropriate instructions, task structure (category focus, breaks), goals, feedback, cognitive diversity, semantic clustering of ideas, positive affect, and openness to experience or plasticity.

There is not much research on convergent collaborative creativity to guide our list of facilitating factors (cf., Rietzschel, Nijstad, & Stroebe, in press). However, we will suggest a number of potential factors. Instructions concerning how to approach the convergent task is likely to be important in how participants go about the process of evaluating the shared ideas (Lonergan et al., 2004; Kohn et al., 2011). For example, having group members first select the most novel ideas and then focusing on making them more feasible may result in a higher quality outcome than focusing on the most feasible ideas and trying to make them more novel because of the strong bias toward feasible ideas (Baruah, Paulus, & Kohn, 2018). Variations in task structure may also be important. Having group members individually select the "best" ideas prior to the group selection process and deliberations may facilitate selection and development of more novel ideas (Putman & Paulus, 2009). Cognitive diversity could also enhance the convergent refinement process as group members share their diverse perspectives (Larey & Paulus, 1999) as long as there are not significant intellectual gaps that would prevent a collaborative refinement of ideas (Cronin & Weingart, 2007). Higher levels of activating affect (higher levels of arousal or energy) may be associated with higher levels of task engagement and may thus enhance both the flexibility and persistence in the convergent innovation process (Baas, De Dreu, & Nijstad, 2008; To, Fisher, Ashkanasy, & Rowe, 2012). It is likely that those high in conscientiousness or ambition (Fürst et al., 2016) and those who have a positive orientation to working in groups may be more motivated to persist in the demanding stages of developing consensus about an innovative product.

Our suggestions for key facilitating factors for the convergent stage have so far little clear empirical support and thus provide a fertile domain for future research. However, there is considerable research support for the facilitating factors related to collaborative divergent creativity. Furthermore, our research has provided some evidence for the role of the processes that link the divergent and convergent stages. The extent of elaboration and the novelty of the elaborations appear to be key factors. A high level of these factors likely reflects a high level of engagement in the collaborative task with an associated high level of attention to the shared ideas and the motivation to build on or elaborate these

ideas. Also, the extent to which group members are "in sync" by being responsive to each other's suggestions, building on them collaboratively and providing mutual feedback (interactional synchrony, Dunbar & Mejia, 2013) should be related to a stronger link between the two phases. We hope our future studies will further enlighten the interactional and personal factors that influence the link between the divergent and convergent stages of collaborative creativity.

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17

The Plasticity of Natural Concepts and Creativity

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This chapter discussed the relationship between the characteristics of concepts used by an individual and a social group on the one hand and the ability to think creatively on the other. We argue that a specific feature of concepts which we call the plasticity of concepts, i.e., the plasticity of the process of object identification, is an important premise for the originality and productivity of thinking. This chapter describes the structure and functioning of natural concepts and experimental data which show how to increase the plasticity of concepts and, consequently, increase creativity. Social factors like the educational system or migration and multicultural meeting points have an important impact on the development of concepts plasticity. To provide an example, in the last part of the chapter, we discuss possible relationships between educational practices in a classroom and concept plasticity in children.

Because of its pertinence both to key theoretical issues and to applied concerns, plasticity is a central concept within education and developmental psychology (Bojesen, 2015). The review of evidence identifying the most effective learning environments and conditions which promote creative skills development in children and young people has shown that the plasticity of concepts,

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together with the flexible use of space and time (Addison, Burgess, Steers, & Trowell, 2010), working outside the classroom/school (Dillon, Craft, Best, Rigby, & Simms, 2007), 'playful' or 'games-based' approaches with a degree of learner autonomy (Cremin, Burnard, & Craft, 2006), respectful relationships between teachers and learners (Gandini, Hill, Cadwell, & Schwall, 2005), opportunities for peer collaboration; partnerships with outside agencies (Robson & Jaaniste, 2010), awareness of learners' needs; and nonprescriptive planning (Kendall, Morrison, Sharp, & Yeshanew, 2008) all have a positive relationship with the development of creative potential. Creative thinking, based on three classic abilities, i.e., flexibility, fluidity and originality of thinking, in general sense consist of going beyond fixed and predetermined patterns of thinking (Guilford, 1967). The development of the plasticity of concepts has an impact on the development of cognitive openness (Dollinger, Urban, & James, 2004). Experiences of creativity and receptiveness to unconventional ideas, cognitive complexity and cognitive flexibility can increase the ability to flexibly integrate intellectual resources to meet current task requirements. The exposition to plasticizing task allows to expect an increase in the ability to resist stereotypes and an increase in tolerance or the expression of heterogeneous opinions in the groups or teams (Robinson, 1998; Sassenberg & Moskowitz, 2005).

Recent studies quite radically change old views regarding the genesis and functioning of the conceptual representation of reality. Traditionally, it was assumed that the adult's cognitive structures primarily consist of "scientific" concepts, and that cognitive development is about their acquisition and improvement (Hampton, 1993; Rosch, 1975a). The content of such a concept is a set of finite features that pertain in an equal manner to all exemplars of the concept and only to these exemplars. Having such concepts, the exemplars can be clearly and easily distinguished from non-exemplars. Moreover, all objects possessing the essential features of a given concept are its exemplars to the same degree. For instance, "a skylark" and "a parrot" are to the same extent the exemplars of the term "bird".

For a long time, this view has been severely opposed. Counter-arguments were based on colloquial observations of the flexible and changeable use of language by people, as well as on difficulties in transferring the content of one's own concepts to "scientific" concepts (Deese, 1967; Lenneberg, 1967; Wittgenstein, 1972). The assumption of the naturalness of such concepts in the human mind also makes it difficult to explain the creative process. It is not accidental that the most interesting contemporary concepts of creativity and its stimulation were created in opposition to academic psychology and its thesis about the "scientificity" of the concepts we use (see Gordon, 1961;

Koestler, 1965; Prince, 1970). Theories of natural language and concepts have been unable to model the flexibility, creativity, context-dependence, and emergence, exhibited by words, concepts and their combinations. The new data allow for the rejection of the thesis about the domination of "scientific" concepts in the human mind and suggest hypotheses about the properties of "natural" concepts arising in the course of natural human development. Such concepts are mental representations of objects and events drawn directly from own as well as socially shared experiences and mental simulations based on such experiences. The above-mentioned studies were concerned with various aspects of conceptual identification made spontaneously by people (Murphy, 2002). They confirmed common observations which show that even for simple concepts, the inclusion boundaries are variable and out of focus, and usually cross the inclusion boundaries of other concepts from a similar taxonomic level (e.g., a toy-tool, see Eliawa, 1967; Tourette, 1976).

Research has also shown that exemplars of concepts differ in the degree to which they become exemplars. People easily arrange exemplars according to how "typical" the exemplars of a given concept are. There is a high agreement in such rankings; the agreement is particularly strong in the area of the most typical exemplars. For example, in American studies, everyone agreed that an "apple", a "thrush", "chemistry" are very common examples of the concepts "fruit", "bird" and "science", and their unusual exemplars are "orange", "chicken" and "sociology" (Rosch, 1975a; Rips, Shoben, & Smith, 1973).

In colloquial language there are a number of terms that allow to vary the degree of typicality of exemplars. Although people are equally sure that both the skylark and the parrot are birds, they only use such terms as, for example, "a real bird", "a bird par excellence" to describe the former one, and terms such as "scientifically speaking bird" to the former one. There is a high correlation between using the first and second types of terms and the felt typicality of exemplars (Lakoff, 1972). To understand the terms "a tall tree" and "a low tree", you need to know what the typical height of trees is. The ease of using similar expressions suggests that natural concepts have such "typical values" encoded in their content (Bierwisch, 1971). In the standard sign language in which a concept is expressed by means of gestures denoting a set of certain exemplars, these exemplars are usually the most typical exemplars (Newport & Bellugi, 1978). When replacing in a sentence the name of a concept with the name of its exemplars, the more typical the exemplar is, the more sense the newly created sentence makes. Sentences in which the name of the concept was replaced with the name of its very unusual exemplar were often regarded as meaningless (Rosch, 1975b).

Research into the semantic space of concepts has shown that a finite number of dimensions can be distinguished in it, and the representation of the content of the concept is located near the central point of this field. The more unusual the exemplar of a given concept is, the greater is the distance between the central point and the point representing this exemplar (Shoben, 1976; Smith, Shoben, & Rips, 1974). The atypicality of the exemplars lengthens the time needed to positive answer to the question: "is object X an exemplar of concept Y?", and it also negatively correlates with the order and frequency of mentioning its name in the task of generating names of exemplars of the concept.

When learning the conceptual categorization of objects, people first master how to distinguish correctly the most "typical" exemplars (Anglin, 1970; Rosch, 1973) and, when assessing the similarity or other parameters of various objects, they spontaneously take more "typical" exemplars as reference points (Rosch, 1975b). The typicality of exemplars affects the subjective assessment of the probability of events: there is a tendency to overestimate the likelihood of appearance of typical exemplars, and to underestimate less typical ones (Kahneman & Tversky, 1972; Rosch, 1976). The less typical the exemplar of the concept about which the information is obtained, the smaller the number of other exemplars to which the features of this exemplars are assigned, and the smaller the number of such features assigned (Rips, 1975).

The results of research on the formation of quasi-natural "laboratory" concepts provide some additional suggestions on the structure and functioning of natural concepts. The experimental formation of such a concept consists of selecting a specific configuration of values on a set of dimensions and then subjecting it to specific transformations. In the experiments that were conducted, both the content and size of these transformations were controlled. The products of such transformations were artificial exemplars belonging, together with the prototype exemplar, to the category. Only some exemplars created through the transformation of the prototype were shown to the participants. Then they were asked to recognize presented exemplars among a wider set of exemplars, including the exemplars not previously presented. The participants almost unanimously included the non-presented prototype exemplars as previously seen objects (Posner, 1969; Posner & Keele, 1968). In Franks and Bransford's experiment (1971), the participants were taught the concepts based on the presentation of exemplars from the transformations of the prototype not shown to them. Then they were given a new set of transformations of this model and the model itself, and asked to assess the extent to which they were sure that they had seen or had not seen these exemplars. All the participants considered the model exemplar as already seen and were more

confident than in the case of other exemplars. The evaluation of the other exemplars was determined by their objective similarity to the model object. It turns out that up to a certain magnitude of the model transformations, exemplars are believed to be seen before, the larger the transformations, the less certainty of such an evaluation. Starting from a specific limit of the transformation, the objects were not considered as belonging to the concept and this conviction raised along with the magnitude of the transformations.

In other studies, several artificial categories were pre-learned on the basis of different prototypes and then sets of their exemplars, without the prototypes, were presented simultaneously. It turned out that people identify model objects just as quickly and without errors as well-known transformed objects, and much faster and unerringly than unknown transformed ones. The more the object is transformed in proportion to the model object, the longer time the identification takes and the bigger the number of misidentifications; this applies to both known and non-known transformed objects. The longer the period that has elapsed from the learning of differentiation to the test, the longer the identification time and more misidentifications of transformed objects, both known and unknown, and the more these two types of objects become similar to each other in this respect. However, in the case of prototypes, the length of the period from presentation to recognition did not affect the identification time and the number of misidentifications (Neumann, 1974; Posner, 1969; Peterson, Meagher, Chait, & Gillie, 1973; Reed, 1972).

Summarizing, the following hypotheses can be formulated (see also Franks & Bransford, 1971; Rosch, 1973; Smith et al., 1974):

1. The structure of natural concepts consists of a prototype element, it can be called the core of the concept, and the area of acceptable similarity to it. The prototype is the cognitive representation of a specific, ideal exemplar. This representation is incomplete – the more abstract the concept, the less features make up for it. The area of acceptable similarity to the prototype may be understood as a collection of values in specific dimensions, where the core is a syndrome of single values, and the representations of exemplars, as suggested by Smith et al. (1974), are single-value syndromes in the same dimensions as the core (and probably on yet other additional, differentiating exemplars between each other).
2. Conceptual identification depends on the activation of the conceptual core and the process of comparing whether the features of the represented object fall within the area of acceptable similarity; a positive result means identification. The hypothesis which seems convincing is that in the identification process the core undergoes a transformation aimed at achieving

correspondence between the content of the concept and the features of the identified object. The larger transformation is required, the longer the identification process lasts, and the more "untypical" exemplar the object appears to be. There is some acceptable magnitude of core transformation; an object whose features go beyond the permissible transformation of the core value cannot be identified by the concept. It can be assumed that the magnitude of the required core transformation determines the degree to which the knowledge about the concept is transferred to its exemplar: the greater the transformation, the less the knowledge about the concept is transferred to a given exemplar.

What types of conceptual representations have the structure and functioning similar to the described ones? The concepts with similar properties to the ones described can be representations of objects and simple processes and situations (e.g. "fruit", "school", "vehicle"). They may include not only specific concepts made of perceptual judgment but also more abstract ones (e.g., the concepts of "crime", "sport", "disease" from Rosch's research, 1975a). It also seems that some individual concepts are similar to those described above, for example: "my dog", "city X", "Mr. Y". Core values would mean such states of those objects that are rated as "most typical" or "most specific". Other states can be easily differentiated in terms of their typicality with regards to a given object.

Other types of natural concepts can be representations of events and actions, or social interactions in which specific dynamic relationships between the elements, mainly temporal ones, exist. An example of such very general concepts are "Exchange" and "Giving", and more specific one is, for instance, "Capitalist exploitation". The theoretical model of the terms "Action" was presented by Rumelhart and Ortony (1977), Shank and Abelson (1977) and Minsky (1975). They point out that concepts with such a structure allow for the identification of typical and less typical properties of their exemplars. For example, the term "Giving" consists of specific relations between the donor, the recipient and the object given, the term also allows to specify that the typical donor is a person acting consciously, and the typical object of giving has, for example, the value for the donor and the recipient.

It can be assumed that on the basis of the terms such as "Action" and the previously discussed types of concepts, cognitive structures of any complexity are created. In psychology, they are sometimes called differently. They should take the form of, for example, social role regulations ("policeman"), representation of a complex social situation ("class struggle"), patterns ("old spinster") and standards (be a "colleague"), as well as patterns of sequences of events and

situations, e.g., “Christmas Eve Dinner”, “Start of the Academic Year”. By referring to colloquial knowledge, it is quite easy to give to each of these concepts more typical and less typical properties of their exemplars. Cantor and Mischel (1977) attempted to analyze the elements of hidden personality theories as concepts that contain cores.

It may be assumed that the important determinant of creativity is the magnitude of the permissible transformation of the cores of concepts – let’s call this feature **the plasticity of concepts** (Trzebiński, 1980, 1981). The greater plasticity of concepts that form the knowledge about one aspect of reality, the more objects can be identified by an individual as exemplars of these concepts. In the process of solving a problem, a greater plasticity of the concepts may, therefore, cause that more information from the environment or from memory is used in solving it. For example, more information incidentally related to a task situation is then used to solve the problem. A greater plasticity of concepts also leads to a situation where more attributes are ascribed to the copies of a given concept as possible ones, e.g., in simulation processes of possible variants of these exemplars.

In addition, the greater the plasticity of concepts forming a field of knowledge, the more concepts that may alternatively identify a given object. The plasticity of concepts increases the probability of partial overlapping of the areas of object identification by a larger number of concepts. This may lead, for example, to the increase in the number of pre-decision conflicts, which increases the decision-making time (as more alternatives are considered and it may also reduce the certainty of the decision taken). However, the greater the number of alternative information taken into account, also these which are incidentally related to the problem, increases the likelihood of falling into an adequate yet non-obvious solution.

The increase in the originality of thinking should be positively influenced by the amount of information used as problem data, the number of subsequent redefinitions of the problem or elements of the problem, which is conditioned by the possibility of making alternative conceptual identifications of a given set of information, and the number of considered variants of a given state of affairs, which depends on the number of attributes assigned as possible to the state of affairs that is being thought of. Moreover, the greater the plasticity of concepts, the more dissimilar the objects identified by the given concept may be, and also, the concepts which are more distant in content can identify the given object.

As a consequence, the greater the plasticity of concepts, the more frequent the existing knowledge is used in other situations and problems which are unlike those with which this knowledge was previously associated. This

increases the likelihood of the development of new problem definitions and new hypotheses, thus leading to a new and original outcome. The diversity of generated solutions (the so-called flexibility of thinking) increases as well.

With the increase of the plasticity of concepts, the subjective certainty of assigning attributes related to a given concept of objects deviating from typical for this concept should increase. This may lead, among others, to a greater cognitive and emotional tolerance of new experiences that are contradictory to the past ones, and a greater sense of reality of "atypical" objects.

According to the above hypotheses, there should be a relationship between the plasticity of concepts and many features of perception and thinking, and social processes. First, we will present correlational data that attest such relationships. Next, we will present the data showing the impact of experimentally increased concepts plasticity creativity (Trzebiński, 1980).

There is a lot of data about the relationship between the plasticity of concepts and the creativity of thinking. The results of the Pettigrew study (1958) confirm the hypothesis of a positive correlation between the sense of reality of "atypical" objects for given concepts and the number of attributes defined as possible exemplars of these concepts (measured with the "Category Width" test). In the Wallach and Caron study (1959), a positive correlation was found between the feasibility of "atypical" objects measured by the same test and the level of originality of thinking. The Wallach and Kogan (1965) study showed a positive relationship between the number and rarity of adequate names of exemplars of given concepts and the originality of thinking. In another study (Worell & Worell, 1965), a positive correlation was found between the degree of uncertainty felt when making decisions in a specific problematic situation and the level of originality measured by RAT. The degree of uncertainty was treated as a consequence of the number of alternatives taken into account before making a decision. This is in parallel with the result of the Sieber and Lanzetta study (1966) indicating that stimulating the level of originality of thinking extends the time of making a decision in a task requiring a single answer. In many studies, a positive correlation was found between the originality of thinking and the number of problems perceived as related to a specific phenomenon, situation or object. It can be assumed that the number of problems that could be formulated in relation to a given problem is the manifestation of, among others: (a) the number of contexts in which this problem was placed, (b) the number of possible states and variants of a given object. Jacobsen and Asher study (1963) showed a positive correlation between the originality of thinking and the flexibility of conceptual identification in the situation where one object is transformed into another. Flexibility meant early and correct identification of the object in transition. In Ward's study (1969),

it was found that the influence of the diversity of the perceptual field in which children solve tasks influences the originality of solutions differently, depending on their level of original thinking. A significantly greater positive effect of the size of the environmental diversity on the originality of solutions was found in children with higher originality of thinking than in less original children. According to Ward, children with a greater originality of thinking made better use of incidental information contained in a variety of environments, not directly related to the task but conducive to the creation of original ideas. Similar results were obtained in the study of adults (Mednick, Mednick, & Mednick, 1964). In Klein, Gardner and Schlesinger's research (1962), a positive correlation was found between the cognitive and emotional tolerance of unrealistic experiences and the originality of thinking.

Our research concerned the relationship between the plasticity of concepts and some prerequisites of the creativity. We wanted to verify the hypothesis on the interdependence of four manifestations of plasticity of concepts: (a) a greater number of concepts identifying the same given objects; (b) a larger number of objects from a given set identified by a specific concept; (c) greater dissimilarities to the core of the concept of the objects identified by this concept; and (d) the number of attributes ascribed as possible to the exemplars of concepts.

In one experiment the participants received two lists containing twenty names of social roles and occupations (e.g. "hunter", "teacher", "thinker", "farmer"). Their task was to identify any groups of these roles and occupations, wherein grouping was multiple and inseparable. The group had to count at least two objects. Each person also gave their own example of the most typical exemplar of the group they created. According to the hypothesis, a positive correlation (in all cases $p < 0.01$) was found between the number of occupational groups created, the average number of occupations included in the group and the level of non-typical occupations classified as exemplars of the concepts of occupational group which were assessed by blind judges (Trzebiński, 1980).

In another task, the participants were asked to choose all attributes from those given to them that could characterize exemplars specific concepts, both general (a battle, a child's play) and individual (my mathematics teacher). As expected, a positive correlation was found between the number of selected features and the three previously mentioned plasticity indicators (in all cases $p < 0.01$; Trzebiński, 1980). In the last task, the respondents were asked to choose such features from those given to them, which are absolutely necessary when defining certain concepts. It was assumed that the fewer features were considered necessary, the more plastic the concept (as the objects which are

further from typical can be identified as exemplars of this concept), and also the larger the spectrum of identification by that concept. The expectation was confirmed (in all cases $p < 0.01$): the fewer features were distinguished as necessary for the exemplars of concepts, the more features were considered possible, the more terms were used to identify the given set of objects, and more and more unusual objects were identified as exemplars of the concept (Trzebiński, 1980).

The next study found a positive relationship between the number of conceptual identifications of a specific set of objects, the number of objects identified by the concept and the degree of non-typicality of these objects and the level of productivity and originality of thinking as measured by Guilford's "Predicting the consequences" and "Finding similarities". At the same time, there were no significant relationships between the plasticity indicators of concepts and the level of general and verbal intelligence (Trzebiński, 1981).

In subsequent studies, we wanted to examine the causal relationship between the plasticity of concepts and creativity using the influence which experimentally and situationally increases the plasticity of concepts, and then observing the level of originality of thinking. In these experiments, the study participants were randomly assigned to three conditions: an interaction increasing the plasticity of the concepts, diminishing plasticity of the concepts and to the control condition – without interaction. In the first two conditions, the participants made a series of identifications requiring either very large or minimal transformations of conceptual cores. These identifications were then cognitively strengthened, because the participants were solving tasks designed to confirm the identifications made. In the identification phase, the subjects were given the name of the concept and a couple of sets of sentences referring to it. Subsequent names were given: "Military", "Soldier", "Officer", "Smart Man", "Friend". Each set consisted of 5–7 sentences describing in an alternative way one aspect of the exemplar of the given concept, for example in the case of "Military" one set described different levels of control of soldiers' behavior by military regulations. The task of the respondents was to choose one sentence from each set. In the interaction aimed to increase the plasticity of concepts, these were the choices of sentences which would characterize a maximally unusual but still sensible exemplar of the concept (example: "Soldiers are dressed as they want"). Whereas in the contrasting influence, these were the choices of sentences describing the "essence" of a given concept, which is the most typical and characteristic feature of the concept. The second phase of both influences was identical and consisted of solving a set of sentences which reassured the participants about the sense of reasonability of the identification made, i.e., the reality of the identified

objects. The accumulation of more of the above experiments should lead to strengthening the tendency to allow large (influence I) or small (influence II) transformation of the cores of specific concepts, and by generalization – also the core of other concepts. On average, the respondents made about twenty identification decisions. The concepts used in the Influence refer to the broadly understood social reality. It can be assumed that the vast majority of "social" concepts have the construction of natural concepts. It was presented to the respondents as a sociological study on the colloquial meaning of selected words. After a few minutes of performing the filler task, the examined performed tests measuring the effects of both influences with another experimenter. They were compared with measurements in the control condition – without any initial influence.

In all experiments, 16–18-year-olds from higher junior schools were tested. According to the hypotheses, it was found that in the "Grouping" test, compared to the control condition, the influence boosting the plasticity of the concepts increased the number of concepts identifying a given set of objects, the number of objects identified by a specific concept and the level of non-typical objects which were identified as exemplars in the Grouping test, while the contrast influence reduced all of it.

In the next two experiments, the influence of experimental interactions and control condition on originality and productivity of thinking was observed, depending on the application or non-application of incidental information.

The aim of the tests of the level of originality was to write a story using five given words, and then to write a story in which two sets of drawings were used to depict characters in a full expression of interaction. The originality of the story was later judged by the competent coders Thinking productivity was measured by the number of adequate consequences given by Guilford's Anticipation of Consequences Test, and by the number of similarities in the test which aim was to find the maximum number of similarities of objects from the given five pairs (e.g., "old man" – "wanderer").

Incidental information provided to the respondents that preceded the implementation of the above tasks, consisted of lists with 20 words meaning various social objects (e.g. "circus", "Roman", "alcoholism"). In order to concentrate on the following words, the respondents were asked to write the first two associations for each of them, as well as to determine the emotions (pleasant – unpleasant on a five-point scale) caused by the object which the word refers to.

The results confirmed the expectations. The influence which focused the participant's attention on the atypical features of the exemplars of concepts increases, and the influence which focused their attention on the typical

features of the exemplars of the same concepts reduces the level of productivity and originality of thinking in comparison with the control condition. In addition, the provision of information incidentally related to the task raises the level of productivity and originality, but only in people who have previously undergone the influence which increased the plasticity of the concepts. We believe that this result shows that the increased plasticity of concepts in a certain semantic domain promotes the use of incidental information in the subsequent task, by finding non-obvious connections which may favour the appearance of additional original inspirations.

Practical implications of the presented data and their theoretical interpretation may concern, for example, creativity training, and the organization of work of teams implementing innovative projects. Important implications may also apply to school education for children and adolescents. How can the plasticity of such concepts be developed in school education? Of course, there are different types of schools and different teaching methods. Yet, in public schools which dominate in many countries, teaching, for many reasons, limits the development of the plasticity of concepts and additionally isolates the development of natural concepts from the knowledge acquired at school. Firstly, the accuracy of reproduction of the transferred knowledge is a primary test of educational effectiveness and at the same time an "operational" learning goal (Feldhusen & Goh, 1995; Midgley, 2002; Schunk, 1995). Secondly, in traditional school systems a teacher is trying to provide as much information as possible within the limits of a lesson time (Sternberg, 2003). Taking into account the limits of time and other resources, teachers are trying to provide as much information as possible using the smallest number of presentations and other didactic forms (Beghetto, 2013). A student is given such information and in such didactic way as to facilitate a fast and smoothly managed acquisition of appropriate knowledge. To achieve this, the content of concepts by means of which this knowledge is transferred must be maximally homogeneous within a given domain of concepts and maximally different from the contents of other concepts.

From the perspective of plasticity concepts, this results in several negative effects. The experiences on the basis of which students form new concepts, refer to the most typical exemplars of these concepts. The learning process eliminates students' activities which are not directly relevant, or irrelevant or erroneous to the content of "appropriate" knowledge. Independent attempts to solve tasks requiring divergent thinking are not facilitated, if not eliminated. If there are problems to solve, their content and ways to deal with them are controlled by a teacher (e.g. by means of feedback or modeling). So these

are attempts "without errors", not differentiated and focused on the typical exemplars of concepts being formed and applied by a student to think. The student's spontaneous activity resulting from aroused curiosity is limited because it is uneconomical. The diversified social interactions between students and between a teacher and students are also uneconomical. Acquiring knowledge which is characterized by high information saturation requires the learner to be highly motivated. These requirements cause the school to use strong and universal, effective incentives (teachers approval and disapproval, rivalry). The use of such stimuli extinguishes the curiosity and play that ensures optimal emotional context for making "non-typical" conceptual identifications and their derivate in problem solving.

All these limitations and reinforcements result in the formation and application of concepts with low plasticity. This can be observed at various levels of education and in different fields of teaching. When teaching economic or social regularities, the "best" and the "purest" examples of specific phenomena, situations or processes are given, and while defining terms "ideal types" of objects are defined. Teaching psychology is based on descriptions and demonstrations of "pure cases" of disorders. In the physical sciences, phenomena observed in laboratory experiments or specific natural experiments are shown. A common feature of these phenomena is their typicality and homogeneity as exemplars of relevant concepts, showing cases that are not too "clean" and ambiguous from the point of view of a given theory is avoided.

On basis of the above considerations, we may suggest the following ways of stimulations concepts plasticity in a classroom.

1. Ensuring contacts with diversified and far from prototypes exemplars of newly learned concepts and concept domains, even at the expense of time (Moran, 2010; Trzebiński, 1981; Wang et al., 2011). This applies, above all, to broadly understood social knowledge, as well as technological and practical knowledge.
2. Creating such tasks and problems which stimulate and even demand free goal directed activity, include mistakes and explorations, even if they are time consuming (Gajda, Beghetto, & Karwowski, 2017).
3. Frequent transmission of content that contains gaps, ambiguities and contradictions that prompt the student to independently define puzzles and make hypotheses (Beghetto, 2013).
4. Enhancing the role of play, in which fantasies and independent ideas are rewarded and mistakes treated as a normal phenomenon (Torrance, 1992).
5. The use of curiosity as the main motivation of knowledge acquisition (Cremin et al., 2006; Treffinger, 1995).

Below we offer a number of examples of tasks used in Poland at workshops which were meant to stimulate the plasticity of concepts in 10–12 year olds. They aim to achieve the unspecific use of concepts, to broaden the boundaries of concepts that consequently break stereotypes of thinking, develop imagination, flexibility and originality of thinking.

Predicting Consequences The teacher invents some unusual, fantastic situations (What would happen if people suddenly realized that they could penetrate through walls, floors, ceilings? What if they lost their ability to sleep? What if they became immortal? What if an insect was the head of the government?). The pupil's task is to think about the possible consequences of this event.

Making Up a Story The pupil's task is to create an understandable story. It does not matter if it is based on facts or invented, it should make sense and contain as many elements as possible (e.g., a toothbrush, a wild animal, a long journey, a telephone conversation, a bowl with cream, a dictionary, a candle).

Find a Solution The pupil's task is to find a solution for each of the situations described (1) You have been locked in a windowless room, there is no one around, the key is behind the door. The room is empty – there is only a hairpin, a newspaper and an empty glass in the corner. How can you get out without breaking the door? (2) You are going for a picnic by the shallow river in the hope that you will catch some fish, but it turns out that you have forgotten your fishing equipment, but you have a plastic bottle of coca cola, a loaf of bread, a knife and a sheet, how can you catch fish?

Associations The teacher gives the first and last word. The pupil should insert between them other words that are associated with the previous and the next one (e.g. sea – water – waves – curls – hair – head).

Features of the Object The purpose of this exercise is to highlight all the features of a given object, starting from necessary, accidental to unnecessary features (e.g., a pen is useful, elegant, dangerous).

100 Definitions Pupils try to define completely familiar and common objects (e.g., how do you think we could we call a chair?). In response, a single feature should be abstracted (e.g., a chair – a monster on wooden legs, it is a poor relative of an armchair).

Disadvantages of Objects The pupils make a list of disadvantages of objects commonly known as useful (e.g. What are the disadvantages of the book?).

At a more general level, some social factors prompt the development of natural concepts with greater plasticity. Their essence is to provide the individual with experiences in which the same or similar concepts are applied to different ranges of phenomenon, shared however some of crucial similarities. The exemplar of such type of experience may are bilingual children living in a multicultural, yet integrated, social environment. There is evidence that such children present higher level of originality of thinking in comparison their colleagues. Communities living in places with high levels of sustainable intercultural contacts, and thus using package of knowledge that are diverse but at the same time subjected to attempts of integration or at least negotiation, show higher innovation in technology and higher culture (Lerner & Hood, 1986; Leung & Chiu, 2010; Simonton, 1997; Thagard, 2012).

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18

Lost in Translation Again: Concepts About Creativity Among Japanese and Polish Prospective Teachers

Aleksandra Gajda

Introduction

Socialization in a specific social group can influence the perception of various aspects of human functioning, for example creativity. This natural feature of every human being is also the engine of intellectual and economic development. Japan is one of the best-developed economies in the world (World Economic Outlook Database, 2016), partly due to its high level of education (OECD, 2014). High learning and teaching standards have a noticeable impact on the dynamic economic development of this country. The belief in the important role of schools and teachers for educating effective and innovative employees is present in many areas of the economy. However, the success of Japanese companies and the Japanese economy is burdened with cultural norms that may inhibit the development of creativity (Yamada, 1991). The Japanese education system is considered to be highly conformist and restrictive. Pupils learn mainly by memorizing, which perfectly develops the ability to learn but may also limit the possibilities for more individualised learning, as well as independent and creative thinking (Schwarz-Geschke, 1994).

Poland, on the other hand, is a society which still struggles with the effects of more than forty years of economic dependence on the USSR, which occurred after the end of the World War II (Boski, 2006). The Polish

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economy is growing rapidly but this seems not to be visibly noticeable by the citizens, especially because of the constantly deepening public debt (Rzońca, 2017). Polish teachers perceive intuitively the need to support creativity (Gralewski & Karwowski, 2012), however, the system's organization does not support creative development (LIBRUS, 2012) by offering students activities which develop mainly their convergent thinking and expecting one right answer. Of course, there are teachers who implement the curriculum and pay attention to strengthening students' creativity (Gralewski, 2016; Karwowski, Gralewski, Lebuda, & Wiśniewska, 2007). However, due to obstacles such as limited learning space, time constraints and overcrowded curricula, this is a challenge and, in most cases, impossible to fully implement (Gajda, Beghetto, & Karwowski, 2017). Meanwhile, excluding personality traits, one of the most important factors on which the innovativeness and creativity of employees and entrepreneurs depends is education and the impact of teachers (Beghetto, 2010; Glăveanu & Beghetto, 2016).

Creativity in Education in the Polish and Japanese Society

Representatives of various societies understand creativity in a variety of ways, depending on cultural and historical background. As research results show, specific patterns of understanding creativity can be found depending on society (Oyserman, Coon, & Kemmelmeier, 2002; Triandis, 2001). Numerous comparisons between representatives of Asian societies, closer to collectivist values, and representatives of Western societies, with a predominance of individualist values (Hofstede, 1980, 1983), suggest that collectivist societies cultivate reflection, conformism and subordination, while individualistic emphasize orientation on the task, uniqueness and independence. For example, when creating ideas by brainstorming, Canadians (an individualistic society) are able to create more solutions than Taiwanese (a collectivistic society), and assess these ideas more easily (Ho, 1998). As the research results show, the level of individualistic and collectivistic values in Poland is almost identical (Oyserman et al., 2002); however, there is a strong pursuit of individualistic values (The Hofstede Centre, 2015).

Of course, both in Eastern and Western societies, creativity is considered an important phenomenon, but it seems that this phenomenon is enhanced in different ways. Western culture is dominated by the cult of novelty and the aspiration to self-expression, while Eastern cultures underline the important

role of skills, abilities, knowledge and appropriate techniques to achieve perfection (Matsunobu, 2013). In Japan, classified as society dominated by collectivist values, the dominance of creativity in Big-C categories prevails (Kaufman & Beghetto, 2009). This high level creativity requires appropriate knowledge and experience, best obtained through contact with a master. Innate abilities play an important role as well. In turn, in Poland, which is inclined more towards individualistic values, creativity is more often perceived through the prism of unconventional functioning, inventiveness and ingenuity (Gajda & Oye, 2017).

Also, in the context of education, creativity has a different meaning in both societies. For example, among Japanese four-year-olds, originality, one of the creative abilities (Guilford, 1967) has no relevance to future educational achievement; however, perseverance in action (persistence) is a significant predictor of future school achievement (Azuma, Kashiwagi, & Hess, 1981). Japanese school teaches how to perfectly master the reproduction, for example, of music (Yamada, 1991). Traditional Asian education is oriented towards moulding and shaping rather than developing individuality (Rudowicz, 2003). At the same time, the Japanese education system, in the course of learning, engages certain elements related to creativity and expression or originality, stressing the need for discipline and achievement of mastery in various areas of functioning. One can venture to say that free expression and discipline associated with achieving mastery in the Japanese education system are equal targets and go hand in hand (Lewis, 1986).

By contrast, the important role of creativity in Polish education remains to be determined (Gralewski & Karwowski, 2012). According to the data included in "The Learning Curve" report by the Pearson Educational Publishing House, Poland's education ranks 14th in the ranking of 50 countries considered. The report is the result of a study conducted by an independent research team, The Economist Intelligence Unit. Researchers analyzed the data containing over 2,500 educational, economic and social indicators for a total of 50 countries around the world. These indicators come, among others, from the three most-valued global educational researches – PISA, TIMSS, PIRLS – as well as country-specific statistics on educational and financial indicators. By comparison, Japanese education is in the fourth position (The Economist Intelligence Units, 2014). Thus, the level of education in Poland is above average, staying in the top twenty of the countries surveyed. Unfortunately, previously published studies confirm the thesis that school is not really conducive to creativity (Gralewski & Karwowski, 2013), and the teachers themselves say that although creativity indeed helps learning and can be stimulated, the Polish education system does not develop this

feature (LIBRUS, 2012). Polish teachers, at least declaratively, appreciate creativity and consider it an important feature that should be developed in school activities. Yet, during school activities, the methods of reproductive learning prevail, and the expectation of providing one, correct answer. Despite the efforts some teachers make to diversify lessons and implement elements strengthening creativity, such as group work or basic brainstorming, it is still a drop in the sea of reproductive learning (Gajda et al., 2017).

Since both Japanese education and the economy are, compared to the Polish realities, at a very high level, and creativity is important for both societies, perhaps the key to understanding the higher position of Japan is a different understanding of creativity? Seeking the answer to this question it is important to understand how prospective teachers perceive creativity and what their views about the role and place of creativity in school education are.

Social Creative Mindsets

Social and cultural factors can indirectly influence a specific kind of beliefs called 'creative mindset' (Karwowski & Barbot, 2016; Karwowski, Gralewski, & Szumski, 2015). This term, formulated by Karwowski (2014), is derived from the theory of 'intellectual mindsets' by Carol Dweck, according to which our understanding of intellectual abilities can be placed on a continuum. At one end there is the fixed mindset – a belief in the immutability of intellectual abilities, which talent rather than hard work is responsible for. At other end, the growth mindset – the view of intellectual abilities as changing over time, and dependent on one's motivation and hard work (Dweck, Chiu, & Hong, 1995). In case of creativity, the mindset theory designates the set of beliefs regarding the possibility to develop creativity and to find the origin of creative abilities. People whose thinking about creativity is closer to a fixed mindset, perceive it as a permanent feature, rather unchanged over time. Therefore, they think that the characteristics associated with creativity, such as motivation or personality, characterize only a selected group of people. Thinking closer to the growth mindset, in turn, allows us to understand creativity and the attributes associated with it as a variable feature dependent on one's commitment and efforts throughout life (Karwowski, 2014).

Fixed or growth mindsets about intellectual abilities are related to well-being, efficient functioning, the nature of educational objectives and satisfaction of learning (Dweck et al., 1995). Early consideration of mindset theory leads to the conclusion that the concept of fixed mindset is more in

line with the type of thinking common for individualistic societies. In turn, the growth mindset will be closer to collectivist societies, due to the celebration of hard work in pursuit of the goal and continuous self-improvement (Dweck et al., 1995). This assumption is confirmed by the results of the first cross-national research using the Creative Mindsets Scale. As study showed, it turns out that Polish students, characterized by a higher level of individualism, perceived creativity more often through the prism of fixed mindset, while German students, characterized by a higher level of collectivism, associated creativity with growth mindset (Tang, Werner, & Karwowski, 2016). On the other hand, as previous research results show, Japanese people more often defined creativity as a feature reserved only for outstanding people, associating it with talent and innate traits, which corresponds to the fixed mindset (Gajda & Oye, 2017). By contrast, the Poles were inclined to associate creativity with continuous development, openness to experience and the possibility of improvement, which could be in part related to the growth mindset (Gajda & Oye, 2017). As the test results are not consistent, it is worth checking whether and how growth and fixed creativity mindsets are related to living in these two societies. The types of creative mindset that characterise future teachers in Japan and Poland may indirectly explain their subsequent efforts invested in developing students' creativity, or the lack of such attempts. Based on the results of previous research (Tang et al., 2016) it is assumed that the group of Poles will be dominated by fixed mindset while the Japanese group by growth mindset. It may turn out that the Japanese understand creativity in a different way than the Poles and, thanks to this view, they are able to use it effectively and, consequently, build a stronger economy. Therefore, it's worth checking whether and to what extent attitudes towards creativity are related to creative mindsets, and whether these relationships differ in various societies.

Method

Participants

The study involved 724 future teachers (478 Japanese and 246 Polish students). Most groups were selected from two universities in Tokyo and two universities in Warsaw. The sample consisted mainly of women and thus no comparisons based on gender were conducted. The average age of respondents was $M = 21.9$, $SD = 4.97$ (Poland, $M = 24.4$, $SD = 6.96$, Japan, $M = 20.4$, $SD = 2.13$).

Measures

1. The *Creative Mindsets Scale* by Karwowski (2014) was used to examine creative mindsets. The concept of creative mindsets is based on the theory of mindsets proposed by Dweck (2006). A 10-item scale is designed to measure perception of the nature of creativity. Answers are measured on a 5-point Likert scale (1 – *definitely not*, 5 – *definitely yes*). The questionnaire enables to estimate whether the subject's way of perceiving creativity is closer to a fixed or growth mindset. The alpha coefficients was $\alpha = 0.656$ for growth mindset and $\alpha = 0.806$ for fixed mindset.
2. The *Creativity Questionnaire* by Bajer and Patston (2016) was used to examine the attitudes towards creativity and its role in education. A 57-item questionnaire was designed to identify beliefs and attitudes towards creativity in the case of teachers and students of education studies ($\alpha = 0.752$).

Procedure

Cross cultural studies are a specific type of research in which it is important to reflect on whether the measures are comparable across cultures. The presentation of stimuli should be equivalent and comparable in different societies, and respondents should respond to the presented stimuli in a similar way (Wang, Hempton, Dugan, & Komives, 2008). To ensure adequate comparability, both research tools used in present study have been translated by a professional translator into Japanese, using common back-translation standards. The study was conducted in a group setting and complied with the ethical guidelines by American Psychological Association (APA, 2010, 2016). Respondents were informed that the survey is anonymous and the results will be presented only as aggregates. The completion of both questionnaires was tantamount to agreeing to participate in the study.

Results

Attitudes Towards Creativity

In order to identify specific attitudes regarding creativity and its role in education, a factor analysis of Creativity Questionnaire results was carried out. The

KMO measure (Kaiser-Mayer-Olkin & Bartlett) was 0.881, so it was advisable to perform this kind of analysis. After analyzing the scree plot, a four-factor solution, with the cut-off point at 0.03 level was chosen (Table 18.1), which explains a total of 34.38% of the variance. Factor 1 (*little c- creativity*, α = 0.734) consisted of 17 statements regarding self-recognition as a creative person who manifests his or her creativity in everyday activity (i.e. 'I think of myself as someone who is creative in everyday life'; 'I am good at thinking of new and original ways to have fun with friends'). This factor corresponds to the definition of little c-creativity. Factor 2 (*importance of creativity at school* α = 0.743) loaded on 19 statements, which concerned the perception of the need to develop creativity in school activities (i.e. 'Students will be more creative if assessment methods used now are changed'; 'Creativity can be developed in group settings'). In factor 3 (*big C – Creativity,* α = 0.705) there were 9 items corresponding to the meaning of big C-Creativity, and thus an understanding of creativity through the prism of art and great works (i.e. 'Creativity refers only to music composition or creating original art works'; 'Creative expression is confined to the arts'). Factor 4 (*teacher as a master,* α = 0.708), on the other hand, was loaded on 8 statements, which concerned the perception of the important role of establishing relations with a teacher as a master for the development of students' creativity (i.e., 'Developing students' creativity is a key responsibility of Primary teachers'; 'Developing students' creativity is a key responsibility of Science teachers'; 'Creativity develops through different stages).

In the case of all factors, significant differences between the respondents from Poland and Japan have been found. The Poles (M = 3.21; SD = 0.40) are significantly more likely to think of themselves as creative people, compared to Japanese (M = 2.96; SD = 0.44) (Factor 1 *little c- creativity*: $t(640) = 7.059$; $p < 0.001$), and often see the need to foster creativity during school hours (Factor 2 the *importance of creativity at school*: $t(445) = 21.324$, $p < 0.001$; Poles M = 3.88; SD = 0.32; Japanese M = 3.34; SD = 0.29). On the other hand, Japanese prospective teachers often associate creativity with art, as an activity available only for talented people (Factor 3 *big C – Creativity*: $t(648) = -6.492$, $p < 0.001$; Poles M = 2.46; SD = 0.53; Japanese M = 2.72; SD = 0.49), and recognize the need to build relations with the teacher, in the role of a master, as a precondition for developing students' creativity (Factor 4 *teacher as a master*: $t(408) = -6.286$; $p < 0.001$; Poles M = 3.40; SD = 0.61; Japanese M = 3.69; SD = 0.49).

Table 18.1 Differences in Creative Mindset Scale response preferences between Poland and Japan

	CMS statement	Poland			Japan			Chi squared
		Extreme	Medium	Other	Extreme	Medium	Other	
1.	Everyone can create something great at some point if he or she is given appropriate conditions	42.3%	42.7%	15.0%	13.6%	59.8%	26.6%	**($\chi^2(2) = 70.12$, $p < 0.0001$; Kramer V = 0.326)**
2.	You either are creative or you are not – even trying very hard you cannot change much	31.4%	53.5%	15.1%	10.2%	62.2%	27.6%	**($\chi^2(2) = 50.90$, $p < 0.0001$; Kramer V = 0.278)**
3.	Anyone can develop his or her creative abilities up to a certain level	30.2%	54.7%	15.1%	12.4%	73.8%	13.8%	**($\chi^2(2) = 34.23$, $p < 0.0001$; Kramer V = 0.228)**
4.	You have to be born a creator – without innate talent you can only be a scribbler	41.0%	39.8%	19.3%	13.8%	57.1%	29.1%	**($\chi^2(2) = 62.36$, $p < 0.0001$; Kramer V = 0.308)**
5.	Practice makes perfect – perseverance and trying hard are the best ways to develop and expand one's capabilities	56.1%	37.8%	6.1%	20.4%	57.0%	22.6%	**($\chi^2(2) = 95.12$, $p < 0.0001$; Kramer V = 0.380)**
6.	Creativity can be developed, but one either is or is not a truly creative person	19.1%	60.6%	20.3%	16.5%	57.5%	26.0%	($\chi^2(2) = 2.90$, $p = 0.235$; Kramer V = 0.066)
7.	Each creativity requires effort and work, and these two are more important than talent	28.5%	54.9%	16.7%	19.6%	52.3%	28.1%	**($\chi^2(2) = 13.89$, $p < 0.001$; Kramer V = 0.145)**
8.	Some people are creative, others aren't – and no practice can change it	34.9%	49.4%	15.8%	9.0%	59.5%	31.6%	**($\chi^2(2) = 72.44$, $p < 0.0001$; Kramer V = 0.333)**

(*continued*)

Table 18.1 (continued)

	CMS statement	Poland			Japan			Chi squared
		Extreme	Medium	Other	Extreme	Medium	Other	
9.	It doesn't matter what creativity level one reveals – you can always increase it	32.4%	52.0%	15.6%	9.7%	53.8%	36.6%	**($\chi^2(2) = 67.18$, $p < 0.0001$; Kramer V = 0.320)**
10.	A truly creative talent is innate and constant throughout one's entire life	27.8%	49.4%	22.9%	14.1%	57.8%	28.2%	**($\chi^2(2) = 18.61$, $p < 0.0001$; Kramer V = 0.168)**

Note: Due to the different size of groups, the analyzes are presented as a percentage. Percentages add up to 100% in rows for each society respectively

The Creative Mindsets Responses Preferences

Moreover, when analyzing the selection of extreme and medium responses, the differences observed between Polish and Japanese respondents were moderate and statistically significant for almost all the statements of the Creative Mindset Scale.

However, despite the overrepresentation of extreme responses in the Polish group and middle responses in the Japanese group, comparisons between societies showed that the Fixed Mindset is more often represented in the Japanese sample (Japan $M = 3.11$, $SD = 0.69$; Poland $M = 2.55$, $SD = 0.93$; $t(325) = -7.599$, $p < 0.001$), while the Growth Mindset in the group of Poles (Japan $M = 3.51$, $SD = 0.61$; Poland $M = 3.89$, $SD = 0.64$; $t(622) = -7{,}292$, $p < 0.001$).

The Relationship Between Creative Mindsets and Attitudes Towards Creativity

Using the four factors of attitudes towards creativity distinguished in the factor analysis and the creative mindsets analysis, correlation analyzes were performed (Table 18.2). It was found that the perception of oneself as a creative person whose creativity is manifested in everyday activities is significantly related to Creative Mindsets only in the Japanese group. Interestingly, the more Japanese consider themselves to manifest their everyday creativity, the lower the level of the Fixed Mindset (Growth Mindset $r = 0.219$; $p < 0.01$, Fixed Mindset $r = -0.169$; $p < 0.01$). In addition, the Growth Mindset in this group is also associated with a perception of the important role of school in developing a child's creativity ($r = 0.216$; $p < 0.01$). The perception of creativity

Table 18.2 Correlations between attitudes towards creativity and creative mindsets in Poland and Japan

	Fixed mindset		Growth mindset	
	Poland	Japan	Poland	Japan
Factor 1 – little c – creativity	−0.050	**−0.169****	−0.021	**0.219****
	N = 194	*N* = 390	*N* = 200	*N* = 391
Factor 2 – the importance of creativity at school	−0.060	−0.042	0.086	**0.216****
	N = 196	*N* = 390	*N* = 201	*N* = 390
Factor 3 – big C – Creativity	**0.466****	**0.359****	**−0.164***	**−0.167****
	N = 199	*N* = 393	*N* = 205	*N* = 393
Factor 4 – teacher as a master	0.137	**−0.238****	0.053	**0.363****
	N = 201	*N* = 396	*N* = 205	*N* = 396

Note: *$p < 0.05$, **$p < 0.01$

through the prism of great works, in the sense of big C-Creativity, correlates positively in both groups with the Fixed Mindset (Poland: $r = 0.466$; $p < 0.01$ and Japan: $r = 0.359$; $p < 0.01$) and negatively with the Growth Mindset (Poland: $r = -0.164$; $p < 0.05$ and Japan: $r = -0.167$; $p < 0.01$). However, a significant relationship between Creative Mindsets and the perception of the teacher's important role as a master in developing students' creativity was noted only in the group of Japanese respondents (Growth Mindset: $r = 0.363$; $p < 0.01$; Fixed Mindset: $r = -0.238$; $p < 0.01$).

Only in the case of relationship between Factor 3 (*big C – Creativity*) and Creative Mindsets it was possible to estimate effect sizes between both societies. Correlations between the Fixed Mindset and Factor 3 in the Polish sample is significantly stronger than in the Japanese sample, although the effect size is not high ($z = 3.79$, $f = 0.13$, $p < 0.0001$). In turn, in case of the Growth Mindset, a slightly higher negative relationship is observed in the case of Japanese respondents ($z = 1.78$, $f = 0.003$, $p < 0.04$).

Discussion

The main aim of the study was to analyze creative mindsets and attitudes toward creativity in educational settings among a group of prospective teachers from Poland and Japan. Contrary to what was assumed, the Japanese understanding of creativity is based on seeing it as immutable and constant. The basis for creativity lies in the great gift and talent that cannot be experienced by all people. The Polish understanding of creativity is more democratic; here it is believed that this feature can be developed. According to Polish participants in this study at least, creativity development requires hard work and effort but, as a consequence, we can expect an increase in creativity and ingenuity. These results differ from previous studies on creative mindsets (Tang et al., 2016). However, creativity is seen more as curiosity than as a revolution. It was assumed in advance that the Japanese are more collectivist and the Poles are more individualistic. The Japanese in general, as an Asian society are mainly focused on group goals rather than on individual goals. In turn, as shown by recent research results (The Hofstede Centre, 2015), Poles strive for self-realization, which sometimes takes place at the expense of the common good. Unfortunately, the level of individualism-collectivism of the participants of the research was not analyzed. Therefore, it cannot be ruled out that the individual differences of the participants could have affected here, regardless of the level of individualism-collectivism in societies.

Trying to maintain equivalence in the analysis, the pattern of responses on the Creative Mindset Scale in the two compared groups were sought. In fact, significant differences occurred, which correspond to earlier results, where the Japanese chose midpoints more often than the Americans (Chen, Lee, & Stevenson, 1995; Grandy, 1996). This probably happens because the Japanese society emphasizes the necessity to conform to the general public, avoid conflicts and adapt to the rules of the social group. Another possible explanation may be the fact that since students learn, eat and spend time together during breaks, Japanese education gives them the opportunity to function and work in a group. In other words, the school environment provides opportunities to develop creativity through group participation (Taylor & Rogers, 2001). Therefore, it is not surprising that, among the Japanese, during achievement assessment, individual originality is not highly appreciated (Lewis, 1986); much more desirable is the ability to be a good subordinate (Taylor et al., 1997). In order not to disturb interpersonal harmony, expressing individual opinions in a social context is usually avoided (Triandis et al., 2001). It seems therefore that the central responses are better suited to these existing cultural norms in the eyes of the Japanese.

Meanwhile, the Poles seem to choose answers according to a trend appropriate for Western societies (Grandy, 1996), using the whole range of responses. Also in this case the assumption has been confirmed that although Poland is a society of mixed influences from East and West, there are clear trends toward individualistic values (Hofstede, 1980, 1983).

It was also noted that Polish prospective teachers consider themselves more often as creative and recognize the need to support creativity at school. According to the Polish common belief that 'the Pole can do', these results are very promising and correspond to previous data on the place of creativity in Polish education (Gralewski & Karwowski, 2012). Starting from the mid-1990s in Poland, there have been numerous attempts to introduce good practices aimed at changing the curricula to develop creative thinking. Trainings for teachers and school managers are conducted, and schools are open to external cooperation (both at home and abroad). The main goal of such activities is to introduce thinking about the education system, in which the school is a place of co-creation of knowledge and creative problem solving, not only its transfer and enforcement (Drozdowski, Zakrzewska, Puchalska, Morchat, & Mroczkowska, 2010). It seems, therefore, that education in Poland is on the rise when it comes to recognizing the need to strengthen creativity in school, and evidence can be found among both current and future teachers. This is a very important conclusion, which allows us to think a bit more positively about Polish education, at least with regard to creativity.

It is difficult to say, however, whether the important place of creativity in education translates directly into economic success. The Japanese associate creativity with works of art and emphasize the teacher's important role as a master who supports students in their creative efforts. The Japanese believe that the development of creativity takes place through contact with the master or authority (Gajda & Oye, 2017), also during professional work (Kondo, 1987) which is similar to how respondents from Japan see the role of the teacher. Both of these constructs of understanding creativity correspond to the concept of Big C creativity (Kaufman & Beghetto, 2009). Interestingly it seems that the understanding of the concept of creativity in Japan is closer to a certain group synergy and ingenuity fueled by team members' joint efforts to achieve the goal (Goncalo & Staw, 2006).

The results of this study are interesting and sometimes surprising. Of course, despite obtaining interesting results, the study is not free from a few limitations. First of all, it should be noted that analysis for individualism – collectivism should be enriched with specific tools, measuring the intensity of these dimensions. The lack of this measurement may blur the actual results in the studied groups. In addition, the tool used to measure attitudes towards creativity in school conditions is currently in the testing phase, so it is worth using other measures with proven reliability in future studies. Finally, given that the study involved a selected group of respondents, in which only women were included, the study should be repeated on a greater number of people, including men.

We can conclude that, both in Poland and in Japan, creativity is considered an important area that should be supported in the school environment. However, in these societies this construct is understood a little differently, which, combined with the characteristics of these cultures, may entail various effects also in the area of economy. Although the Poles stress more the necessity to develop creativity in school activities, and consider themselves more often as creative individuals, the Polish economy is still developing. On the other hand, the Japanese seem to believe less in their own creative capacities, identifying creativity to a greater extent with great discoveries in art and science. This understanding of creativity, however, combined with the need for action for the benefit of the group and society, brought Japan significant economic success. It is difficult to determine what the future holds for both societies, but certainly they can learn from each other's experiences and, hopefully, the realities of the 21st century will make this possible.

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19

Nomination of Domestic and Overseas Creative Celebrities: The German Style and the Factors Behind It

Min Tang and Markus Moser

Our world is evolving towards a Creative Age (Florida, 2007), where the intangible assets of creativity and innovation are becoming the primary driving force behind personal and societal development. Under such a "world climate", more and more countries and international institutions have made policies or launched programs to meet the global need for creative talents (Tang, 2017). College students are the future of economic development and social changes. Their perceptions of creativity and what makes a creative person are important channels for us to understand young people's implicit theories of creativity, which have the power to refine our current scientific (or "explicit") theories of creativity (Sternberg, 1985) and to either inhibit or facilitate creative expression (Runco & Johnson, 2002).

To date, most implicit theories of creativity studies focus on laypersons' perceptions about the nature or attributes of creativity (e.g., Lim & Plucker, 2001; Runco, 1989; Runco, Johnson, & Bear, 1993; Seng, Keung, & Cheng, 2008). Another line of studies focuses on people's perceptions of creative celebrities and points to *meritorious vs. aesthetic salience* concerning students' nominations of creative individuals (e.g., Cheung & Yue, 2007; Yue, 2003, 2004; Yue & Rudowicz, 2002). Meritorious salience refers to the valuation of the creators' social merits, recognition, and influence. Aesthetic salience refers to the valuation of the creators' innovation, novelty, and individuality, etc.

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Though meritorious salience has been repeatedly tested and confirmed with Chinese samples (e.g., Cheung & Yue, 2007; Yue, 2003, 2004), aesthetic salience has been more theorized than empirically tested, except the recent study of Yue, Bender, and Cheung (2011). The present study was designed to bridge this gap by re-examining the pattern of German students' nomination of creative persons and investigating the personal and social attributes that might lead to the use of a certain evaluation salience.

Implicit Theories of Creativity (ITC)

Implicit theories are persons' opinions and views about a particular construct (Runco, 1999). In contrast to explicit theories, which are held by scientists, implicit theories are held by laypersons (such as students, teachers, and parents). Sternberg (1985) pointed out that studies of implicit theories are of theoretical and practical importance for complex constructs such as creativity. To date, a large body of literature on ITC exists, which covers different layperson groups such as teachers and/or parents (e.g., Chan & Chan, 1999; Runco, 1989; Runco & Johnson, 2002; Runco et al., 1993; Seng et al., 2008), students (e.g., Karwowski, 2009; Seng et al., 2008), or politicians, scientists, artists, and school teachers (Spiel & von Korff, 1988) or large samples with people of different age and professional groups (Lim & Plucker, 2001). These studies mainly focus on laypersons' perceptions of the concept and nature of creativity and applies a social validation method to uncover the content of lay beliefs. Some recent studies have extended this line of work by studying new perspectives such as creativity symbols (Glăveanu, 2011) or comparing the ITC across cultures (e.g., Lan & Kaufman, 2012; Paletz & Peng, 2008; Runco & Johnson, 2002).

In China, Yue and colleagues (e.g., Cheung & Yue, 2007; Yue, 2003, 2004; Yue & Rudowicz, 2002) take another approach. They have carried out a series of studies to investigate Chinese students' perceptions of the most creative Chinese and foreign creators. Through these studies, they have developed the meritorious vs. aesthetic salience theory. While meritorious salience stresses the valuation of the creators' social merits, recognition and influence, aesthetic salience lays more weight to the valuation of the creators' innovation, novelty, and individuality, etc. Subsequently, meritorious salience leads to the nomination of politicians, scientists, inventors, businessmen, strategists, etc., and aesthetic salience results in the nomination of artists, musicians, writers, philosophers, and entertainers, etc. (Yue, 2003; Yue et al., 2011). With large Chinese samples, their studies have consistently found that the Chinese

students were inclined to nominate politicians, scientists and inventors (*meritorious salience*) rather than artists (*aesthetic salience*) as the representatives of the highest level of creativity (Cheung & Yue, 2007; Yue, 2003, 2004; Yue & Rudowicz, 2002).

Though hypothesized and discussed in all the above-mentioned studies, the aesthetic salience was not empirically tested with German samples except in a recent study which involved 437 Chinese and 166 German undergraduates (Yue et al., 2011). As expected, results of this study re-confirmed the meritorious salience of the Chinese nominators and confirmed the aesthetic salience of the German students. While the Chinese undergraduates nominated more politicians, scientists or inventors, but rarely artists and musicians, the German undergraduates mostly nominated philosophers, artists, and writers but rarely politicians. This study, however, only described the patterns of nomination in both countries without explaining the possible attributes that might lend explanations to the nomination patterns. The current study takes a sociocultural approach and attempts to analyze the contributions of different personal and social attributes to the phenomenon of aesthetic salience among German students.

Sociocultural Theories of Creativity

Csikszentmihalyi (1994) pointed out that it would be impossible to approach creativity without taking into account the social and environmental elements surrounding a person, as creativity is not an attribute of individuals but of social systems making judgements about individuals. Culture influences creativity via creative expression and via judgements of creativity (Niu & Sternberg, 2001). Therefore, it seems mandatory to accommodate the issue of creativity judgements from a social contextual perspective.

The Western culture, strongly influenced by individualism, is known for its emphasis on novelty and freedom of expression as part of its conception of creativity (e.g., Amabile, 1996; Sternberg & Lubart, 1999). In line with this tendency, Western people were found to attach more importance to the aesthetic attributes of creativity (Rump, 1982; Sternberg, 1985) and the expression of one's individuality rather than the fulfillment of one's social obligations (e.g., Runco & Bahleda, 1987; Sternberg, 1985). This sociocultural context also influences the Westerners' nominations and evaluations of creative persons. For example, when asked to nominate geniuses in history, British undergraduates tended to nominated artists, musicians and scientists rather than politicians (Smith & Wright, 2000). Polish undergraduates mostly nominated

writers, artists and musicians as the most creative people in history (Tokarz, Beauvale, Zyla, & Rudowicz, 2004). A comparison of Chinese and German students' nomination of creative representatives revealed that German undergraduates mostly nominated philosophers, artists, and writers, whereas Chinese undergraduates mostly considered politicians, scientists or inventors as their models of creativity (Yue et al., 2011).

From a sociocultural perspective, a creator is more likely recognized when he or she has exerted personal influence over others and attracts admirers of his time (Simonton, 1988). This means that both personal and social attributes are important determinants of the results of the evaluation. Content analyses of the justifications for creator nomination revealed that the factors that led to the nominations were not restricted to the dispositional attributes of the creator (e.g., creativity, originality) alone. Rather, they also covered social factors such as the fame and social contributions of the nominated persons (Cheung & Yue, 2007; Yue & Rudowicz, 2002, Yue, 2003). It was found that Chinese students laid more weight on social contributions in nominating creators from the meritorious salience fields and more weight on creativity level in nominating creators from the aesthetic salience fields (Yue, 2003). It is worth noting that the above results were found among Chinese students. The current study attempts to examine the issue with a German sample.

Availability Heuristics of Social Media on Judgments

With the fast growth of modern communication technology, social media has become one indispensable part of our daily life, especially for the Millennials. A study of 2600 Millennials from five countries, including Germany, revealed that more than 50% Millennials spend at least 3 hours per day on their smartphones connecting to the Internet (Koppitz, Hess & Meyer, 2017). Therefore, it would make sense to take the influence of the Internet, particularly social media, into consideration in the study of young people's judgements of creative persons. One classic theory in probing the effect of media on judgement and decision making is the *availability heuristics* (Tversky & Kahneman, 1973). Availability heuristics maintains that individuals base estimates of the frequency or probability of events on the ease of accessibility of information from the memory. In making social judgments, individuals typically tend to rely on a subset of information most accessible from memory instead of searching exhaustively in the memory for information supporting

the judgment (for reviews, see Sherman & Corty, 1984). Because of the predominant use of Google as searching engine in our digital age, Google hits can be used as a reliable indicator of the accessibility of information about possible candidates of the most creative persons.

Gender, Stereotypes, and Creativity

Gender and creativity has long been a hot topic in the field of creativity studies. As early as in 1974, Kogan published an extensive review of gender differences in creativity and concluded a "relative equality" of males' and females' levels of creativity. For the past ten years, narrative reviews and meta-analyses started to emerge to summarize the relation between gender and creativity. Baer and Kauffman (2008) systematically reviewed the studies of gender and creativity for different age groups and types of creativity assessment. They found an overall lack of gender differences in creativity with females showing slightly higher creativity than males. The slight lead of females in creativity was reconfirmed by recent meta-analysis studies, including one involving 2,013 effect sizes from 111 studies (Ma, 2009) and another including 271 studies, 480 effect sizes and 137,247 participants (Thompson, 2017).

However, when it comes to the real-world creative accomplishments, a definite male-dominance has been consistently observed (e.g., Piirto, 2004; Simonton, 1994). External factors such as cultural values and social roles (Helson, 1990, Piirto, 1991), gender role expectations (Kerr, 1997), and role congruity theory (Eagly & Karau, 2002) are typically used to explain this phenomenon. These sociocultural and environmental factors can lead to the overestimation of males' creativity. Through five correlational and experimental studies, Proudfoot, Kay, and Koval (2015) revealed a gender bias favoring males over females in the attribution of creativity. Building on three complementary field and experimental investigations, another study found that innovative work behaviors were stereotypically associated with men and men's innovative works were more favorably evaluated than women's (Luksyte, Unsworth, & Avery, 2018). Male dominance is also reflected in nomination studies. It was found that British undergraduates' perception of geniuses was predominantly male rather than female (Smith & Wright, 2000). Interestingly, Cheung and Yue's (2007) study revealed that though the nominated Chinese creators were disproportionately male, there were no differences between male and female creators in terms of the recognized qualities.

The Present Study

The present study focuses on two major questions: Firstly, does the aesthetic salience, which was observed in previous studies, still hold true for a representative sample of German students from different universities? Secondly, what are the personal and social attributes that might lead to the aesthetic of meritorious salience?

Methods

Participants

A total of 192 students (62.5% females, *Mage* = 26.1, *SD* = 4.4) from 13 German states participated in the study. All participants were German citizens, including 10 with migration background. The majority of the participants were postgraduates (53.1%) and undergraduates (39.6%) of universities (65.1%) or applied universities (34.9%). These students nominated a total of 296 creative Germans and 386 creative persons of the world.

Measures

In order to explain the nomination patterns, a Creator Nomination Scale (CNS) was developed. This scale was developed based on three key dimensions previous studies have identified, including creativity, social contribution and esteem (Cheung & Yue, 2007). Esteem was revised into likability, because likability is an important affect heuristic that people usually consult in making judgements and decisions (Slovic, Finucane, Peters, & MacGregor, 2007). Besides, likability is also a typical criterion in creativity evaluation studies (see Amabile, 1996). A fourth dimension, namely "influence of others" was added, because social influence has been widely used to help explain behavior, opinions and beliefs in sociology, marketing, and political science, etc. (see Sewell, 2018).

Three to four items were developed to measure each of the dimensions. After a preliminary factor analyses with *oblimin* rotation using 0.40 as the cut-off point for suppressing loadings (Stevens, 1992), factors that did not load on any factor or cross-loaded on multiple factors were deleted. The final version of the scale is composed of 13 items, which can be reduced into four factors: creativity (3 items; e.g., "How creative is this person"?), likability

(3 items; e.g., "How much do you like this person?"), social contribution (3 items; e.g., "How significant is the social contribution of this person"), and influence of others (4 items; e.g., "How much do your friends and relatives esteem this person"?). This four-factor solution accounts for 73.8% of the total variation. Participants rated the creators on a 10-point Likert scale ranging from 1 = "the least" to 10 = "the most". The inter consistencies of the variables are high, with Cronbach's α of 0.77 for creativity, 0.74 for likability, 0.87 for social contribution and 0.82 influence of others.

Media coverage was measured by the number of Google search results at the end of June, 2017. In most of the cases, the full names of the celebrities were used for the search and the entries of the first page of the results were checked for conformity with the searched names. For some artists, the artist names instead of the birth names were used, for example, "Loriot" instead of Vicco von Bülow (German comedian and humorist). The scores of the media coverage range from 1240 to 604 million with an average of 44.7 million, *SD* = 63.4 million. The distribution of this variable demonstrates an acute positive skewness, therefore, log-transformation was used to reduce the skewness.

Creative fame was computed by summing the number of nominations made by the participants. This method is similar to the studies of public perceptions (Schwartz, 1998) and consistent with the Cheung and Yue's (2007) study. If one candidate was creative in multiple areas, he/she received a score of one for each additional domain. The fame scores range from 2 to 33 with an average of 10. The fame scores were also positively skewed. Hence, this variable was also log-transformed for subsequent data analysis.

Procedures

Participants were asked to nominate up to three most creative persons from Germany and the world, respectively. Afterwards, they rated each nominated creator on creativity, likability, social contribution and social influence. In order to eliminate the influence of social media, two controlling questions were imbedded to filter out the participants who simply used the Internet to search for the answers.

Nominations were coded following the procedures of the previous studies (Yue, 2003, 2004). The year of 1900 was used to differentiate the historical figures (those who died before 1900) from the modern figures (those who died after 1900 or are still alive). The second author and two other psychological Master students coded the occupational categories of all the nominees.

The coding schema was a combination and slight adaptation of the categories used in previous studies (Cheung & Yue, 2007; Yue et al., 2011), which included ten areas: (1) scientists/inventors (including scientists, inventors, doctors, engineers, architects); (2) politicians (including emperors, ministers, governors, heads of state, social or human rights activist); (3) writer/poets (including authors, poets, novelists, essayists); (4) philosophers/educators (including philosophers, educators, scholars, religious thinkers); (5) fine artists (including painters, draftsmen, photographers, architects, ceramists, conceptual artists); (6) performing artists (including musicians, composers, singers, dancers, actors, entertainers); (7) generals/military strategists (including generals, military strategists, military theorists); (8) businessmen/entrepreneurs (including financial managers, bankers, business managers); (9) sportsmen/coaches; and (10) Others (e.g., fictitious or godly figures). If a nominee was creative in more than one domain, the person would be coded by what he or she was best known for, as agreed by the three coders. Intercoder consistency was high, with 0.91 kappa coefficient.

Results

Nominations of the Most Creative Persons from Germany and the World

Table 19.1 presents the nominations of the top 10 ranks (composed of 12 candidates) from Germany. These nominations account for 39.2% of the total nominations. The aesthetic salience is obvious with 9 candidates from the aesthetic salience fields, including 6 artists, 2 writers or poets and 1 philosopher. Only 3 were from the meritorious salience fields such as politics, science, and military, $\chi^2(1) = 12.45$, $p = 0.000$. In terms of the gender of the candidates, the majority ($n = 10$) were males whereas only two were females, $\chi^2(1) = 42.24$, $p = 0.000$. The living time of the candidates was evenly distributed for the historical and modern figures.

The list of the top most creative persons in the world shows a somewhat different picture (see Table 19.2). With 6 candidates from aesthetic salience areas and 5 from meritorious salience areas, the difference between the two types of nomination was insignificant, $\chi^2(1) = 0.01$, $p = 0.939$. Steve Jobs and Albert Einstein, both are from the meritorious salience fields, ranked the first and second on the list followed by Pablo Picasso. Interestingly, meritorious salience was largely (4 out of the 5 nominations) attributed to the modern

Table 19.1 The top 10 ranks of the most creative persons from Germany

Nominee name	Rank	Frequency	Percentage[a]	Sex[b]	H/M[c]	Area of achievement[d]
Johann W. von Goethe	1	31	10.5	m	H	Literature
Angela Merkel	2	19	6.4	f	M	Politics
Albert Einstein	3	16	5.4	m	M	Science
Friedrich Schiller	4	10	3.4	m	H	Literature
Ludwig van Beethoven	5	8	2.7	m	H	Performing Arts
Jan Böhmermann	6	6	2.0	m	M	Performing Arts
Immanuel Kant	7	5	1.7	m	H	Philosophy
Stefan Raab	7	5	1.7	m	M	Performing Arts
Caspar D. Friedrich	9	4	1.4	m	H	Fine Arts
Helene Fischer	9	4	1.4	f	M	Performing Arts
Otto von Bismarck	9	4	1.4	m	H	Military
Xavier Naidoo	9	4	1.4	m	M	Performing Arts

[a]The percentages are calculated based on the total of 296 nominations
[b]m males, f females
[c]H Historical figures – those died before 1900, M Modern figures – those died after 1900 or still alive
[d]Area of Achievement: In case of eminence in multiple areas, only the major area of achievement will be listed

Table 19.2 The top 10 ranks of the most creative persons of the world

Nominee name	Rank	Frequency	Percentage[a]	Sex[b]	H/M[c]	Area of achievement[d]
Steve Jobs	1	30	7.8	m	M	Business
Albert Einstein	2	26	6.7	m	M	Science
Pablo Picasso	3	25	6.5	m	M	Fine Arts
Leonardo da Vinci	4	20	5.2	m	H	Fine Arts
Elon Musk	5	16	4.1	m	M	Business
Johann W. von Goethe	6	13	3.4	m	H	Literature
Salvador Dali	7	11	2.8	m	M	Fine Arts
Wolfgang A. Mozart	8	10	2.6	m	H	Performing Arts
Vincent van Gogh	9	8	2.1	m	H	Fine Arts
Bill Gates	10	7	1.8	m	M	Business
Mark Zuckerberg	10	7	1.8	m	M	Business

[a]The percentages are calculated based on the total of 386 nominations
[b]m males, f females
[c]H Historical figures – those died before 1900, M Modern figures – those died after 1900 or still alive
[d]Area of Achievement: In case of eminence in multiple areas, only the major area of achievement will be listed

innovation leaders from the business fields including Elon Musk (rank 5), Bill Gates (rank 10), and Mark Zuckerberg (rank 10), besides Steve Jobs. Surprisingly, the top 10 places of this list were all occupied by male creators. The modern figures (n = 7) were significantly over-represented than the historical figures (n = 4), $\chi^2(1) = 0.29.14$, $p = 0.000$.

So far, the analysis was focused on the top rankings and the aesthetic salience was confirmed by both lists but was more pronounced in the list of the most creative Germans. What is the case with the total nominations? Is aesthetic salience still pertinent when all the nominations are taken into consideration? To answer these questions, all nominations were classified into three major areas, including aesthetic salience areas (arts, literature, and philosophy/education), meritorious areas (science/invention, politics, business/entrepreneurship, and military), and others (sports and non-celebrities whose fields of achievement cannot be identified). Results of this analysis are presented in Table 19.3.

Results of this analysis provide further evidence for the aesthetic salience of German students' nomination of high-level creators: about two thirds (65.9%) of the total German nominations fell into the aesthetic salience category, whereas only 26.8% belonged to the meritorious salience category, $\chi^2(2) = 205.83$, $p = 0.000$. The aesthetic salience was, once again, not that pronounced

Table 19.3 Total nominations in terms of aesthetic vs. meritorious salience in Germany and Worldwide

	Germany			World		
	Rank	Frequency	Percent[a]	Rank	Frequency	Percent[b]
Aesthetic salience						
Performing Arts	1	97	32.8	2	71	18.4
Fine Arts	5	26	8.8	1	100	25.9
Literature	2	59	19.9	5	46	11.9
Philosophy/Education	7	13	4.4	7	14	3.6
(M_{rank})/Total	(3.8)	195	65.9	(3.8)	231	59.8
Meritorious salience						
Science/Invention	3	34	11.5	4	54	14.0
Politics	4	31	10.5	6	17	4.4
Business/Entrepreneurship	8	12	4.1	3	69	17.9
Military	9	2	0.7	9	3	0.8
(M_{rank})/Total	(6.0)	79	26.8	(5.5)	143	37.1
Others						
Sports	6	20	6.8	8	9	2.3
Non-celebrities	9	2	0.7	9	3	0.8
(M_{rank})/Total	(7.5)	22	7.5	(8.5)	12	3.1
	$\chi^2(2) = 205.83$, $p = 0.000$			$\chi^2(2) = 212.31$, $p = 0.000$		

[a]Percentage based on 296 total nominations
[b]Percentage based on 386 total nominations

for world nominations, but still the total percentage was nearly 60% in comparison to 37% for meritorious salience nominations, $\chi^2(2) = 212.31$, $p = 0.000$. Overall, males were more likely to be nominated than females in both cases, with 84.5% nominated male creators from Germany, $\chi^2(1) = 140.60$, $p = 0.000$, and 89.4% males from the world, $\chi^2(1) = 239.42$, $p = 0.000$.

Taken together, the descriptive analysis of the nomination data revealed a clear aesthetic salience in German students' evaluation of both German and world creative celebrities. This salience was more pronounced with the German nominations than the world nominations and with earlier nominations than later nominations.

Predicting Creative Fame

The nominated creators' sex ($r = -0.09$, $p < 0.05$) and their living time ($r = -0.32$, $p < 0.01$) were negatively related to their fame, indicating that males and historical figures were somewhat more likely to be recognized for their creativity. The four factors of the Creator Evaluation Scale were moderately correlated with r ranging from 0.35 to 0.52, $p < 0.01$, indicating a good discrimination among the variables. These variables were all positively correlated with fame except likability. The strength of the correlations, however, were not very high, $r = 0.17$ for creativity, 0.25 for influence of others, and 0.33 for social contribution, $p < 0.01$. The highest correlation was between Google hits (media coverage) and fame, $r = 0.62$, $p < 0.01$. Results of the descriptive statistics and correlations among the variables are presented in Table 19.4.

Table 19.4 Descriptive statistics and correlations among the variables

	M	*D*	1	2	3	4	5	6	7	8
1. Creator's Sex	–	–	(–)							
2. Creator's Living Time	–	–	0.21**	(–)						
3. PA-Creativity	8.21	1.32	−0.13**	−0.17**	(0.77)					
4. PA-Likability	7.03	1.64	0.03	0.06	0.44**	(0.74)				
5. SA-Social Contribution	7.06	1.89	0.05	−0.14**	0.35**	0.40**	(0.87)			
6. SA-Influence of others	7.09	1.56	−0.04	−0.05	0.48**	0.52**	0.44**	(0.82)		
7. L_Google hits[a]	7.03	0.98	0.05	−0.12**	0.12**	−0.03	0.31**	0.23**	(–)	
8. L_Fame[a]	0.77	0.46	−0.09*	−0.32**	0.17**	−0.04	0.33**	0.25**	0.62**	(–)

* $p < 0.05$, ** $p < 0.01$; *M* Mean, *SD* Standard Deviation; Numbers in the Parentheses are the values of Cronbach's α

[a]Log-transformed variables

In order to examine which variables account for the nominations from the aesthetic vs. meritorious areas, we conducted a four-step multiple regression analysis with the areas of achievement as grouping variables. We entered the two demographic data (sex and the living time) of the nominated creators in Step 1, the two personal attributes (creativity and likability) in Step 2, and the two social attributes (social contribution and influence of others) in Step 3. The Google hits as indicators of the media coverage were entered in the last step. Tables 19.5 and 19.6 presents the results.

Table 19.5 Summary of regression analysis for variables predicting the fame of the creators nominated from the aesthetic salience areas

	B	*SE* B	β	*p*	95% CI of B [LL, UL]	(Δ)R^2
Step 1						R^2 = *0*.35***
Creator's Sex	−0.09	0.05	−0.07	0.103	[−0.19, 0.02]	
Creator's Living Time	−0.51	0.04	−0.57	0.000	[−0.59, −0.44]	
Step 2						ΔR^2 = 0.02**
Creator's Sex	−0.07	0.05	−0.05	0.208	[−0.17, 0.04]	
Creator's Living Time	−0.49	0.04	−0.54	0.000	[−0.56, −0.41]	
PA-Creativity	0.06	0.02	0.16	0.000	[0.03, 0.09]	
PA-Likability	−0.04	0.01	−0.15	0.002	[−0.07, −0.02]	
Step 3						ΔR^2 = 0.05***
Creator's Sex	−0.09	0.05	−0.07	0.073	[−0.19, 0.01]	
Creator's Living Time	−0.43	0.04	−0.48	0.000	[−0.51, −0.36]	
PA-Creativity	0.03	0.02	0.08	0.076	[0.00, 0.06]	
PA-Likability	−0.07	0.01	−0.26	0.000	[−0.10, −0.04]	
SA-Social Contribution	0.03	0.01	0.15	0.002	[0.01, 0.06]	
SA-Influence of others	0.05	0.01	0.18	0.000	[0.03, 0.08]	
Step 4						ΔR^2 = *0*.05***
Creator's Sex	−0.13	0.05	−0.10	0.009	[−0.20, 0.01]	
Creator's Living Time	−0.36	0.04	−0.40	0.000	[−0.51, −0.36]	
PA-Creativity	0.03	0.02	0.08	0.091	[0.00, 0.06]	
PA-Likability	−0.06	0.01	−0.21	0.000	[−0.10, −0.04]	
SA-Social Contribution	0.02	0.01	0.09	0.068	[0.01, 0.06]	
SA-Influence of others	0.04	0.01	0.15	0.001	[0.03, 0.08]	
L_Google hits	0.12	0.02	0.25	0.000	[0.00, 0.00]	
Final Model	F(7, 407) = 49.95					R^2 = 0.46***

**p < 0.01, ***p < 0.001

Table 19.6 Summary of Regression Analysis for Variables Predicting the Fame of the Creators Nominated from the Meritorious Salience Areas

	B	*SE* B	β	*p*	95% CI of B [LL, UL]	(Δ)R^2
Step 1						R^2 = 0.07***
Creator's Sex	0.01	0.09	0.01	0.862	[−0.15, 0.18]	
Creator's Living Time	0.46	0.11	0.27	0.000	[0.24, 0.68]	
Step 2						ΔR^2 = 0.04*
Creator's Sex	0.09	0.09	0.07	0.298	[−0.08, 0.27]	
Creator's Living Time	0.47	0.11	0.28	0.000	[0.25, 0.69]	
PA-Creativity	0.07	0.02	0.21	0.005	[0.02, 0.12]	
PA-Likability	−0.00	0.02	−0.01	0.879	[−0.04, 0.03]	
Step 3						ΔR^2 = 0.13***
Creator's Sex	0.05	0.08	0.04	0.565	[−0.12, 0.22]	
Creator's Living Time	0.39	0.11	0.23	0.000	[0.18, 0.60]	
PA-Creativity	0.00	0.03	0.01	0.855	[−0.05, 0.06]	
PA-Likability	−0.05	0.02	−0.21	0.005	[−0.09, −0.02]	
SA-Social Contribution	0.05	0.02	0.18	0.014	[0.01, 0.09]	
SA-Influence of others	0.11	0.02	0.38	0.000	[0.06, 0.15]	
Step 4						ΔR^2 = 0.35***
Creator's Sex	0.06	0.06	0.04	0.374	[0.07, 0.29]	
Creator's Living Time	0.14	0.08	0.08	0.097	[−0.08, 0.21]	
PA-Creativity	0.01	0.02	0.04	0.459	[−0.05, 0.02]	
PA-Likability	0.01	0.01	0.04	0.477	[−0.01, 0.04]	
SA-Social Contribution	0.00	0.02	0.00	0.935	[−0.01, 0.04]	
SA-Influence of others	0.00	0.02	0.01	0.847	[−0.02, 0.04]	
L_Google hits	0.33	0.02	0.73	0.000	[0.00, 0.00]	
Final Model	*F*(7, 213) = 44.44					R^2 = 0.59***

*p < 0.05, ***p < 0.001

For nominations from the aesthetic salience areas, Step 1 with the two demographic data was significant, R^2 = 0.35, F(2, 412), = 108.76, p = 0.000. But only living time of the creators significantly predicated their creative fame β = −0.57, p = 0.000. The addition of personal and social attribute variables, as well as the number of Google hits, results in significant increments in R^2, which leads to the final model which accounts for the 46% of the variance in creative fame. In this model, the creator's living time (β = −0.40, p = 0.000), likability (β = −0.21, p = 0.000), the influence of others (β = 0.15, p = 0.001) and the Google hits (β = 0.25, p = 0.000) are significant predictors. This pattern of

results suggests that, in the aesthetic salience fields, historical rather than modern creators, who are more recognized by others (influence of others), and who have made more social contributions are more likely to be recognized for their creative fame. Nevertheless, these creators are not necessarily very much liked by the persons who nominate them.

For nominations from the meritorious salience areas, the Step 1 model was significant, $R^2 = 0.07$, $F(2, 218), = 8.58$, $p = 0.000$. Like the case with the aesthetic areas, the sex of the creators did not play a signification role in predicting the creative fame. Contrary to the case of the aesthetic areas, modern creators are more recognized in the meritorious areas. The addition of personal and social attribute variables, as well as the number of Google hits, results in significant increments in R^2. Interestingly, before the number of Google hits was entered into the model (Step 3), the pattern of results was exactly the same as that with the aesthetic salience areas except for the sign of the variable "creator's living time". This means that in the meritorious salience fields, modern rather than historical creators who are more accepted by others and whose social contributions are higher are more recognized for their creative fame. Again, these creators are also not very much liked by the persons who nominate them. The addition of the number of Google hits results in a substantial increase of variability, $\Delta R^2 = 0.35$, $F(7, 213) = 44.44$, $p = 0.000$. In this model, the strong influence of the Google hits suppresses the influence of all other predictors and the model accounts for 59% of the variation in creative fame of those nominated.

Discussion

The analysis of the nominations of both German and international creative celebrities revealed a clear aesthetic salience – the German students nominated predominantly creators from the aesthetic salience fields, particularly the fields of literature and arts. This result is in consistency with Yue et al.'s (2011) study. Interestingly, in both studies, Johann W. von Goethe was nominated as the most creative German. This result can be due to the special "unmasterable past" in view of the more recent history of Germany with two world wars and the Holocaust, which has had a huge impact on German national identity (Maier, 1988). It was the German writers, thinkers, and philosophers who found the best arguments against National Socialism in Germany and criticized the political development in the 19th and 20th century when Germany was highly developed as a modern nation but lacking democratic modernization (Taylor, 2001). It is also interesting to notice considerable overlaps in the

results of Yue et al.' (2011) study the present one. For example, the following creators appear in the top 10 most creative Germans in both studies: Goethe, Einstein, Schiller, Beethoven, and Bismarck, and the following appear on the top 10 most creative persons of the world in both studies: Picasso, da Vinci, Dali, Mozart, van Gogh, and Bill Gates. The fact that the aesthetic salience was more pronounced with the German nominations than the international nominations may result from a spiritualized thinking about what German culture is. Germans see themselves as the country of poets and thinkers (Carlisle, 2009; Hohendahl, 1989).

Significantly more male than female creators were nominated in both conditions. This result is consistent with the existing studies (Cheung and Yue 2007; Luksyte et al., 2018; Proudfoot et al., 2015). Why is that? Traditionally, gender roles have not offered many possibilities for women to make remarkable creative achievements. Because of this restriction, female's creativity is usually not recognized, devaluated or not optimally developed (Tang, 2010). Given the fact that meta-analyses have actually revealed a slight lead of women in creativity (Ma, 2009; Thompson, 2017), the under-recognition of highly-achieving female creators is worth attention. Studies are needed to examine the internal and external hindrances that might lead to the "leaky pipeline" of creative contributors at the higher level.

In the list of international nominations, meritorious salience was largely attributed to the modern innovation leaders from the business fields from USA, including Steve Jobs (rank 1), Elon Musk (rank 5), Bill Gates (rank 10), and Mark Zuckerberg (rank 10). This finding, on the one hand, reflects the new Zeitgeist of the world, which glorifies the heroes and leaders of innovation. On the other, it also proves the power of social media. All four technology tycoons have brought disruptive changes to the technological industry and our society, which puts them in the spotlight of social media. Meanwhile, they themselves and their companies are active users of social media and this gives them advantages in social media branding (Yan, 2011), which is essential in today's marketing communication.

Stepwise regression analysis revealed that, in both the meritorious and the aesthetic salience cases, personal attributes account for creative fame and the addition of social attributes add more variance. These results indicate that the nomination of creative celebrities is, indeed, influenced by both personal and social attributes and the impact of the social attributes are bigger for the meritorious ($\Delta R^2 = 0.13$, $p < 0.001$) than the aesthetic salience areas ($\Delta R^2 = 0.13$, $p < 0.001$). This result is consistent with what Yue (2003) found through his study with Chinese students. So the different weight on social or personal attributes in nominating creators from meritorious vs. aesthetic salience fields

seem to be consistent across Eastern vs. Western cultures. Of course, cross-cultural studies involving samples from both Eastern and Western cultures are needed before we can make conclusions about this.

Media coverage (Google hits) adds 35% additional variance in the creative fame of the creators from the meritorious salience areas, in comparison to the 5% additional variance in the case of aesthetic salience areas. These results suggest that in our digitalized world, media coverage has a huge impact on a creator's fame, especially those from the meritorious salience fields. This result also provides further support to the effect of accessibility heuristics on people's perceptions and judgements (Tversky & Kahneman, 1973).

The negative correlation between likability and the creative fame shows that participants can appreciate the creative and social contributions of a creator, but still *dislike* the person. This seemingly paradoxical result can be explained by the dark side of creative personality. Studies have revealed some negative personality traits of creative persons such as creative artists demonstrating more biological vulnerability and negative emotions (Akinola & Mendes, 2008), creative persons being potentially dishonest (Gino & Ariely, 2012), many of them being narcissistic (Furnham, Hughes, & Marshall, 2013). This dark side of the creative persons can trigger negative emotional reactions such as the low level of liking.

In summary, the current study confirms that German students tend to nominate creative celebrities from the aesthetic salience areas. Whether it is concerned with the aesthetic or meritorious salience areas, the judgment of creativity is influenced by both personal and social attributes. The influence of the media coverage makes the largest contribution to the creative fame of the nominated persons. Future studies should consider more complex measures of media coverage and apply cross-cultural design to further examine people's perceptions of creative persons.

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20

The Paul Gauguin Syndrome: A Great Life Change

Piotr K. Oleś

Introduction

Changes occurring in an adult's personality may proceed in keeping with the person's existing developmental tendencies or, on the contrary, they may amount to a radical shift, altering the direction of his or her life trajectory. While the former imply a continuation of personal aims, the latter are connected with radical change. For instance, emotional transformation around midlife follows the former pattern (Lachman, 2001), whereas the Gauguin syndrome, as well as now-or-never phenomena, represents the abrupt type of change since it entails a great change of lifestyle, priorities, and one's entire life paradigm (Levinson, 1986).

Paul Gauguin's biography, full of changes and discontinuities, become a prototype for the developmental phenomenon in adulthood called the Gauguin syndrome (Rohmann, 1953). More specifically, his sudden decision to quit work in a bank and to start a new life path as an artist, what in consequence destroyed his private life and dramatically lowered the social status of his family, became a model for what a great life change might be. A spectacular aspect and at the same time the essence of Gauguin's change was that he sacrificed life stability and social position for creative work. He overcame all internal and external obstacles and realized a new life path leading to exploring his talent.

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Moreover, he changed life paradigm for one close to his aspirations. In an existential context, he solved one of the most important dilemma we are faced with: to become the author of one's own life or to live according to social expectations. A great change of life priorities and a quest for outstanding creativity both illustrate the first dimension of the Gauguin syndrome.

The second dimension is that he created a pattern or even a kind of prototype for what is a creative and purposeful life. According to social modelling theory (Bandura, 1991) such pattern can be followed by other people given its attractiveness: for example, creating well-known pieces of art, or the sense of happiness and/or fulfilment experienced by the author regardless of the difficult life conditions. When a person poses a question regarding life purpose or meaning, one possible and expected answer is that a life devoted to any higher idea and living in agreement with inner preferences is purposeful and meaningful by definition; it might even be enough to follow the pattern of a great life change and to decide for creative changes instead of unattractive but socially approved adjustment (Obuchowski, 2009). Moreover, creative modeling conveys the rules for innovative behavior. "This higher level learning is achieved through abstract modeling. Once observers extract the rules underlying the modeled activities, they can generate new behaviors that go beyond what they have seen or heard" (Bandura, 1999, p. 173). And this is the essence of both social creativity (Glăveanu, 2015) and life creativity (Zittoun & de Saint-Laurent, 2015).

Thus, the third dimension of the Gauguin's syndrome is social. A model of a great life change nurtures the imagination and can inspire individuals and groups to follow such patterns. However, to change one's life into more exciting, interesting, purposeful or flow-oriented directions requires additional conditions, individual and social; imagination is a necessary but not sufficient condition. Other conditions refer to readiness for brave development of internal potential and social acceptance for "the wind of change". Social changes and social creativity in a given cultural context seem possible and many individuals share strive towards higher values, standards of self-development and the desire for a creative life (see Zittoun & de Saint-Laurent, 2015).

Multidimensional change models presuppose the plasticity of the developmental process and allow for changes to have a considerable range of indeterminacy (Caspi, Roberts, & Shiner, 2005; Elder & Caspi, 1990). According to contextual models, the occurrence and the course of change, as well as its effects and permanence, are determined by a make-up of factors and interactions between the individual and the socio-cultural environment (Lachman & Bertrand, 2001; Lerner, 1978; Lewis, 1999).

If we describe change using the activity versus reflection dimensions, change combined with action and a lower level of autoreflection is more

typical of adolescence. Precisely that pattern of great life change, i.e., the dominance of external activity over internal – of action over reflection – emerges from descriptions of great life change.

A great change of life trajectory, typical for the Gauguin syndrome, either results in or results from a transformation of identity. Every major change presents a challenge and sometimes even a threat to identity, which makes the continuation or retention of unchanged elements of personality such an important issue here (Oleś, 2011). From the viewpoint of development and adaptation, it seems optimal to strike a balance between the stability of identity, on the one hand, and the readiness for change, as well as openness to a new experience, on the other (Cohler, 1982). Changes that follow the continuity pattern, such as the emotional transformations mentioned above, do not affect identity (that is, not until the person realizes their effects) and, actually, even reinforce it (Oleś, 2013). On the contrary, an abrupt change, occurring as a radical shift, constitutes a threat to identity and demands its reconstruction. A change of this kind affects the system of personal meanings concerning the self as well as the most important values and aims of the person. This is what makes the Gauguin syndrome such a fascinating phenomenon for psychologists.

Viewed from the perspective of self-realization or transcendence (that is, with reference to higher values), making a major life change may take on the character of an existential necessity, an attempt to start an authentic life (Jacobsen, 2007) and/or break free from those tasks and roles that were regarded as foreign to one's personality and that involved the person in instrumental activity (for instance, making it possible to earn a living). The abruptness of the change is a consequence of the strong need to redefine one's identity as well as of the fact that the revision underway affects the very priorities of life (cf. Oleś, 2008). The sudden character of the change, the break with the former lifestyle that it involves, as well as the accompanying change of environment and activity, are all supposed to guarantee the irreversibility and permanence of the change.

Paul Gauguin and His Contribution to the Development of Life Span Psychology

The Gauguin syndrome is a sudden, unexpected change of life line – often incomprehensible to others – involving a change of priorities, lifestyle, environment, and main forms of activity (Oleś, 2011; Oleś & Kłosok-Ścibich,

2009). The syndrome's paradigm is to be found in the life of the French post-impressionist painter and sculptor Paul Gauguin, a life full of turbulent shifts (cf. Mayer, 1978). Examples of the syndrome abound in popular novels and films, which not only invent a new phenomenon in the way they portray human trajectories, but pose questions about continuity and change. The story of John Koffend, an American journalist and editor of *Time Magazine*, was known in the 1970s. Following in Gauguin's footsteps, Koffend abandoned his work and family and left for the Oceanian island of Pago Pago in order to live there in harmony with nature. He later wrote a novel, entitled *A Letter to My Wife*, explaining his decision.

The syndrome was named after the eminent artist Paul Gauguin (1848–1903) (Rohmann, 1953). His interesting life story comprises a number of sudden changes, both intentional and accidental. When Gauguin was still a boy, his family emigrated, for political reasons, to Peru, where he lived for 5 or 6 years. After returning to Paris he felt alienated, longing for nature and yearning to travel. The sense of maladjustment and alienation in the Western world that Gauguin experienced in childhood may have played a part in his break with the bourgeois lifestyle in adulthood. The dream of traveling he started to fulfill as a teenager, by running away from home to get a job in the merchant navy and later in the naval forces. He served at sea for a total of 6 years. On returning to Paris, he took up a job as a bank broker – and amateur painting. At the age of 25, he married a rich Dane, Matte-Sophie Gad, with whom he had five children. With time, Gauguin grew more and more passionate about painting, but nothing foreshadowed his great life change. At 34, he announced: "From now on, I am going to paint every day," gave up his job in a bank, and started a new life: the life of an artist.

Some of Gauguin's biographers suggest that the dramatic decision to change his life line may have been influenced by the economic crisis, the bankruptcy of Union Generale, and the loss of employment. These events are supposed to have prompted his decision to devote himself entirely to painting (Crepaldi, 2006, p. 24). Still, it is also known that he could have resumed his work as a broker but rejected that possibility, devoting himself wholeheartedly to art.

The family's economic situation and living standards deteriorated significantly, which led to its breakdown. His wife left Paris with four children, and Gauguin with his eldest son lived in poverty, earning their subsistence by putting up posters.

The change, foreshadowed by the youthful escape from home, prompted further shifts in search of artistic inspirations. An exceptionally creative time began in Gauguin's life, marked by his tempestuous friendship with Vincent van Gogh and his journey to Polynesia, which together gave rise to a new

artistic style. On the Polynesian islands, he sought artistic inspiration while savoring the exotic nature and culture. He became romantically involved with a Maori girl, but the relationship did not last long. He briefly returned to Europe, tried to sell his paintings, and left for the Polynesian islands again, almost completely breaking off contact with his family.

At the age of 46, he settled in Tahiti, and then on the Marquesas Islands. He had conflicts with missionaries and local authorities. Paul Gauguin's last years abounded in turbulent relationships. He had two more teenage wives, and a child with each. He suffered from a heart condition, malaria, and syphilis. He abused alcohol. Despite all of this, he still did a considerable amount of artistic work. Life in the Polynesia fulfilled the dreams and yearnings of Gauguin's childhood, but it also turned out to be a personal failure because he lived the rest of his days haunted by loneliness and not understood by critics. The only people present at his death were the old medicine man Tioka and the Reverend Vernier.

What is characteristic for Gauguin's life story is the quest and changes in it, perhaps a quest for identity in contact with nature and primeval culture. Creative anxiety or a desire to return to childhood longings could be pinpointed as causes of these changes. Sudden shifts, the attitude of a rebel swimming against the tide, the need for change, impulsiveness, and transitory relationships, but also intransigence and readiness to pay any price for the possibility of creating art – all these appear jointly to paint the picture of Gauguin's life.

Paul Gauguin's change of life line is sometimes looked at as a spectacular case of midlife crisis, with the characteristic impulsive tendency to change and a minimal amount of reflection. The lack of reflection in his life is compensated by the depth and existential richness of art, an example being his masterpiece "Where Do We Come From? Who Are We? Where Are We Going?"

The Gauguin Syndrome: A Psychological Perspective

The concept of the Gauguin syndrome has taken hold in life-span psychology; it denotes one of the ways to live through the so called midlife crisis or midlife transition – a spectacular one, but also the most interesting one from a psychological point of view. The Paul Gauguin syndrome is an attempt to stimulate or confirm personality change through a change of environment and activity forms. The change concerns behaviors as well as patterns of thinking, feeling, and acting. The Gauguin syndrome consists in changing one's

personality through changing the life line and breaking with one's current lifestyle, which entails abandoning current roles and tasks. Indeed, environment change is regarded as one of the central mechanisms in personality change (Caspi et al., 2005). Such a change may result in a release of creative energy. One can talk about the Gauguin syndrome when the change of life line aims at the implementation of a new plan and carries with it a chance for the fulfillment of a desirable vision of life, often enabling development of artistic abilities. Its essence, it lies in striving for personal development at the cost of reinterpreting priorities, values, goals, life objectives, and the entire self-world relationship. Before the change brings the desired results, it incurs a number of destructive effects, for it often happens at the cost of family and friends as well as destabilizes one's professional and socio-economic situation. Nonetheless, it does contain a developmental and creative element since it initiates the process of new identity creation.

This is precisely what happened in Paul Gauguin's case. However, the phenomenon takes multiple forms and its actual course depends on a given individual's features, as people differ considerably in terms of personality traits and adaptation styles, and have unique life histories behind them. Nowadays, the Gauguin syndrome – or rather the Gauguin myth – amounts to forcing personality transformation by changing the environment and lifestyle – or, frequently, to a quest for happiness and authenticity at the cost of abandoning everything that comes down to a role, a social standard, or routine. If a change of life circumstances constitutes the first step towards identity change, then indeed we are dealing with the Gauguin syndrome; if, however, a change of environment does not lead to identity change but only results in temporary adjustment to the new circumstances, we speak of the Gauguin myth. The term myth means that a change is superficial and, as a result, the person gains a sense of identity change without real transformation of it. The person cultivates a myth about change supported by a new environment, however he or she does not reflect and rebuilt identity (a new form of adaptation instead of an internal change). The syndrome essentially consists in attempting to find one's authentic self, in forging a new identity and a new concept of oneself; the change of environment and activity is meant to contribute to it and confirm it, but cannot force it to happen if personal involvement and proper reflection are lacking.

Considering a great life change as one of important signs of midlife crisis places emphasis on activity change corresponding to environment change, with a minimal amount of reflection. Instead of continuation of the current lifestyle and adherence to the current life paradigm (Levinson, 1986), a change occurs, and the action that brings it about appears not to be preceded by

reflection. The phenomenon is somewhat reminiscent of testing the world by trial and error during an identity crisis. The trial and error developmental strategy implies openness to experience and may result in creative solutions. In both crises, changes are not reflected on until they have been accomplished. In the case of midlife crisis, the change affects the sense of identity and may result in the loss of a consistent concept of oneself, making it necessary to create it anew. Originally, the Gauguin syndrome is conceptualized as an abrupt and sudden rather than continuous change, and one with action prevailing over reflection. The question arises of whether such an understanding of the syndrome finds support in empirical facts.

The Gauguin Myth

Apart from the Gauguin syndrome, the concept of the Gauguin myth appeared (Mayer, 1978; Oleś, 2013). The syndrome has certain features of a myth when the shift it involves leads to a repetition of an unsatisfying life scenario, being a mere escape from a difficult situation, a mere expression of hope that in a new place it will be possible to make a fresh, different, better start – and the environment change is supposed to help accomplish that. The myth, then, amounts to a sense of personality change, emerging as a result of moving to a different environment: a change of life circumstances without the accompanying reflection. Changes of this kind turn out to be superficial and impermanent; they are motivated by the need to escape from a sense of stagnation. The Gauguin myth is connected with an expectation of quick effect without a conscious reconstruction of identity. It consists in trying to force an inner change by making an outer change, but the altered circumstances only allow to alter the way of behaving and the related feelings, and only for the time of actually experiencing these new circumstances. A recurrence of or return to the former circumstances results in a relapse into the former state. This is a frequent end of illusions connected with hope for a renewal of the self in a new emotional-sentimental relationship. When former problems recur, the person relapses into former behavior patterns. The attempt at changing identity and reforging the concept of oneself ends in a failure. Such an unsuccessful attempt at identity change may produce an even more acute sense of failure, but it may also be perceived as a relieving episode of "the true self."

Admittedly, the distinction between the syndrome and the myth of personality change is fuzzy; what is more, we do not really know why a change of lifestyle results in identity change in some individuals but not in others. The amount of autoreflection and the involvement of the subject's intention

emerge as important differentiating criteria: the greater these are, the more likely the change is not to prove a myth only. Still, the eminent artist's life story as well as psychological theory suggest something more. The change may have the character of an escape, and then it is likely to turn out a myth; or, it may involve the inner motivation to accomplish a subjectively important goal (Deci & Ryan, 1991; Rya & Deci, 2000). In the latter case, the change gives expression to personal predispositions and talents; it has a specific aim, the way artistic work does. It is inner motivation that probably plays the decisive role here, favoring identity change (cf. Sheldon & Kasser, 1995). Moreover, Gauguin syndrome has to do with optimal functioning (Sheldon, 2004), while the myth has to do only with more or less adaptive change. So, the difference is twofold and it involves internal change of identity and external consequences in life style or activity.

The Gauguin Syndrome: Definition, Criteria, Explanation

Analyzing the Gauguin syndrome phenomenon, I propose the following defining postulates:

1. a significant and irreversible change in life priorities,
2. resulting from a sense of unfulfillment in an important sphere of life,
3. resulting in a revision and reevaluation, and a new form of activity,
4. causing a deterioration (at least temporary) of the person's situation – for instance, owing to the necessity of relinquishing social security;
5. actions taken are based on values different from those formerly held, or on their completely new interpretation;
6. the decision is taken on one's own responsibility, without support from family and friends;
7. the change gives a sense of freedom and harmony with oneself, and the new form of activity is what invests existence with meaning;
8. the change has an evident aspect of life creativity (see: Oleś, 2013; Oleś & Kłosok-Ścibich, 2009).

The change is so profound that it involves reorganizing the self-concept, as well as one's habits, and behavior patterns; it affects personal (or social) identity, effectively changing it. To an observer, the change of life line may seem incomprehensible, sudden, unprepared, or even hardly sensible. To a person making such a change, it will be comprehensible and sensible, which is not to

say that the person experiences no doubts after the change has been accomplished. This disproportion stems from the fact that the main motive spurring a person to make an important change is the sense of unfulfillment (cf. Magai & Halpern, 2001).

What mechanism is responsible for the great change of life line? There are a few possible interpretations of the phenomenon. Below, I propose five hypothetical explanations of the Gauguin syndrome.

1. The change may result from accumulated frustration and an unfulfilled, strongly suppressed need for change. Avoiding reflection on the meaning of events in one's life and on the choice of goals, which vary at different stages of adult life, results in an increasingly intense need for change. Suppressing changes and the tension that this creates may lead to loss of control and to making a major but poorly prepared life change, such as abandoning work and parents – a radical shift of life line (cf. Block & Block, 1980; White, 1975).
2. The change may result from persistent and growing discrepancies within the self system, especially between the ideal self and the real self (Higgins, 1996). Failure to meet the standards of the ideal self and the existence of possible selves (Markus & Nurius, 1986), highly desirable and comprising unaccomplished goals or untapped talents, may inspire a radical attempt to make these possibilities come true. This process may be catalyzed by the undesired self (Ogilvie, 1987), which gains importance and becomes more and more real (e.g., because of a squandered talent), thus intensifying tension. Tension within the self system may in turn produce changes, which find their outer expression as well as their guarantee of permanence in the search for a new environment and new forms of activity.
3. Another factor that may underlie the change is a lack of satisfaction with one's current life and a fear of losing what has been achieved owing to the passage of time and the changing situation. When life's tasks inherent in one's social, professional, or family roles terminate, and the new ones seem unsatisfying and redundant (e.g., taking care of grandchildren instead of fulfilling dreams), the possibility of a radical shift opens up – a perspective of taking up the responsibility for shaping life according to one's own plan (cf. Obuchowski, 2009). This radical change is partly an escape from the destructive approach-avoidance conflict, and partly a search for new perspectives and self-fulfillment.
4. The change may result from a reinterpretation of one's life story yielding a negative balance of the past and at the same time an unambiguously positive assessment of chances for creative life in the future. These chances are

perceived as depending on whether changes are made and activity is taken up that is consistent with the dream of one's life and has not been implemented before. The imaginative exploration of new perspectives on one's course of action makes it possible to find new life path and to employ necessary changes (Glăveanu, 2015). Life creativity can result also from creative cognition implying generation of preinventive structures (possible live paths) conceptual refinement or expansion (more defined concept of future life) and possible applications paying attention to internal and external chances and limitations of a great life change (Finke, Ward, & Smith, 1992; Nęcka, 2005). The reinterpretation may then occur almost like an illumination in solving a logical problem since it results from a change of viewpoint from which life is evaluated and its balance drawn up (cf. Hermans, 1996, 2002).

5. Finally, the change may result from a growing tension, caused by a discrepancy between personality (when identity is reinforced rather than modified appropriately to developmental tasks) and the inevitably changing life structure (i.e., the prevalent pattern of the subject's activity and relationships with the environment; see Levinson, 1986). An individual may try to adjust personality to life structure by making an even greater change to life structure – that is, by making it comply with one of the elements of personality: the dream. Great life change, then, is perceived as a continuation of earlier tendencies and a simultaneous break with those that limit individual freedom. Such a change may have a creative dimension to it (a development of talent) or a self-destructive one (breaking off contacts, abandoning important things).

What the Research Reveals

Research on the Gauguin syndrome phenomenon may be conducted in at least two ways. The first of these consists in analyzing the biographies, published in psychological literature, of outstanding and ordinary people who made significant life changes or/and identify turning points in their lives (see Lebuda & Oleś, 2015). Biography analyses may be found, for instance, in Elliot Jaques' publication (1965), or in the book edited by Dan P. McAdams, Ruthelen Josselson, and Amia Lieblich (2001). Assuming that the choice of biographies is not random, and their content may be modified for the purpose of a given study, analyzing people who have made a great life change appears to be a more reliable path to take. In order to learn more about the

Gauguin syndrome, a few students at the SWPS University of Social Sciences and Humanities (Warsaw, Poland) interviewed in-depth individuals who had made significant changes in their lives. The criteria for the selection of participants in the first project were the following: (1) aged between 25 and 50 and (2) an important life change (that is, a positive answer to the question about whether there had been an important change in their lives, performed by themselves). The study was conducted by means of the case study method, using McAdams's *Life Story Interview* (1993). Each interview was preceded by a short conversation about life shift. 11 people took part in the study: 7 women and 4 men, aged between 29 and 52, in whose life an important change had occurred, relatively independent of fateful causes.

The aim was to establish whether changes described as the Gauguin syndrome amount to a continuation of earlier life story or to a shift, as well as whether and to what extent they reflect the transformations of identity connected with midlife crisis, as Jaques (1965) postulates they do. The analysis of empirical material was to consider the studied phenomenon in terms of two dimensions: continuity vs. shift and reflection vs. action. It was also important to differentiate between the Gauguin syndrome and the Gauguin myth – that is, to establish whether the change resulted from (narrative) identity or was meant to affect it.

In the conversation about important life change, which supplemented the interview, the issue was raised of the significance that the participants ascribed to the change in the context of their personal development, sense of fulfillment, and internal integrity. Most life stories elicited turned out to be stories of outsiders who abandoned comfortable urban life in order to move away from civilization to live in harmony with themselves and the rhythm of nature. Case study showed that great life change had been either foreshadowed or preceded by a long period of struggle through dilemmas. The change was only perceived as sudden by others; participants themselves say that numerous events accounted for it, that they had been preparing it mentally for a long time, and that it resulted from their personal development (Oleś & Kłosok-Ścibich, 2009). Even if in some of the stories "action precedes reflection," in none of them is reflection entirely absent from the change. In some cases, life shift came as a result of prolonged reflection; in others it was change that initiated intensive inner development and provoked deep autoreflection. Even impulsive changes were accompanied by a certain amount of introspection and inner work.

This study was replicated and results of other research suggested that (1) Gauguin syndrome is possible during adulthood and not specific for the midlife crisis, (2) it is possible to identify signs of continuity when analyzing

all life span (e.g., love for nature in adolescence and moving into farm in adulthood); (3) there are some heralds of a great life change in childhood, adolescence or emerging adulthood (e.g., openness for experience, risk taking, or reflection on identity).

According to McAdams's theory (1993), life story is an insight into and a manifestation of an individual's identity. Is there anything characteristic in the content of the elicited life stories? Usually, it is redemption sequences that dominate in these autonarratives. Emotional sequences of this type are understood as changes proceeding from negative to positive emotions and feelings, such as the joy of a child on the mother's return after an unsettling period of absence (McAdams & Bowman, 2001). By their very nature, such sequences correlate positively with the sense of coherence and satisfaction with life. Moreover, in all cases the change consists in following the *imago* and pushing the *antiimago* "to the background." *Imagoes* are connected with redemption, freedom, development, overcoming patterns, unconventional behavior, and not succumbing to the influence of others (e.g., "the free wanderer," "the liberator and return to the source," "the outsider and the villain," "one who has the courage to live in truth and ask inconvenient questions," "the spiritual leader on the path towards self-awareness and insight"). On the contrary, the *antiimago* embodies enslavement (e.g., "burdening with guilt," "compelling me to be different that I am," "incapacitating," "cut off from one's own emotions," "unaware of the dark side of life," "the man in the street, immersed in roles and routine"). In a majority of cases, the life shift is connected with a change (or, possibly, with further implementation) of the autonarrative's main theme and with attempting to overcome limitations (e.g., "freedom from patterns," "abandoning routine," "truth and dialog," "unlimited freedom and space," "self-awareness and insight," "life in harmony with nature and the primordial truth"). In all the narratives a search for a complement of the self were present, and in two cases additionally enriched by the motif of starting a journey. The conclusion is that the Gauguin syndrome typically includes a pursuit of self-actualization, liberation, and crossing one's own boundaries, and often also a quest for identity, a new place on earth, or a new occupation. The list above definitely meets the criteria for life creativity (Zittoun & de Saint-Laurent, 2015). The motif of movement is also characteristic – starting a trek or a journey (either physical or psychological).

Individual differences are present in the way the change is implemented as well as in its causes, such as a prematurely crystallized identity understood as identification with one's role, or a growing sense of maladjustment and alienation from the environment, combined with a pursuit of life in harmony with oneself. Case study suggests that a change following the Gauguin myth

pattern – that is, forcing identity change through environment change – is characterized by a prevalence of contamination sequences, a pessimistic emotional tone, a low level of autoreflection, and lower integrity of the life story. Such changes probably amount to escape from stagnation and disappointment.

Empirical data elicited from only a limited number of people cannot be treated as an authoritative source of knowledge about the studied phenomenon; yet, they certainly do reveal some of its forms. The following elements of life creativity appear to be characteristic: (1) a pursuit of authenticity and expressing oneself in a way that seems closest to one's needs and preferences; (2) a search for such forms of activity and such environment that will enable or reinforce identity change; (3) the existence of continuity, manifesting itself in openness to change or in resemblance between experiences connected with the renewed identity and those from earlier periods of life (Oleś, 2013). Changes described as the Gauguin syndrome are most adequately captured by narrative thinking (Bruner, 1990), because it is this type of thinking that allows to convey the intentional reinterpretation of identity. At this point, we cannot fail to remark on another limitation to the interpretation made. Namely, it was the participants themselves who defined a life change as important; inspired by the issues and questions raised in *Life Story Interview*, they interpreted the change in terms of continuity and shift. Thus, our labeling of a change as significant and discerning elements of continuity is merely a reflection of how participants themselves interpret it (cf. Löyttyniemi, 2001). What is more, because the way of eliciting interview data – McAdams's method (1993) – assumes the continuity of narrative identity (manifesting itself in the life story), the result pertaining to continuity may be a reflection of the method used.

The reconstruction of identity is visible at the level of the self-narrative. It manifests itself in a change of the self-narrative's main theme, in a change of goals, personal plans, beliefs, and values, as well as in giving voice to *imagoes* – the idealized images of the self. McAdams's theory (1993) allows for the possibility of a significant change in life and even distinguishes two kinds of such changes. Developmental changes occur by degrees and consist in a transformation of the personal myth in a direction consistent with the overall trend of human development: towards greater openness and reliability as well as greater immersion in generativity issues. Changes of this kind may be reflected on, but their gradual nature produces the impression of continuity. Changes of the second type are personological – much more thorough and consisting in a complete reconstruction of life story. They are made possible by deepened psychotherapy because personal identity is made up of elements shaped at various stages of life, which makes it necessary to return to these stages and

look for alternative ways to generalize experiences. This is the only way to reconstruct an alternative personal history.

Neither type of change captures the essence of the Gauguin syndrome. According to narrative identity theory, a change following the Gauguin syndrome scenario must have a strong basis in the constructed life story – for example, in the form of a tendency to change and search for conditions enabling personal fulfillment or realization of the meaning of life. Even if the theory does mention life transformations and turning points, it places emphasis on the continuation of some development tendencies that were weakly marked before rather than on a radical change that allows to close a part of the life story and begin an entirely new chapter in it (McAdams, 2001).

In the context of life-span psychology, great life change may be seen as resulting from the implementation of optimization strategies. With resources diminishing – i.e., with a limited number of years left to live, energy dwindling, and talents untapped – the individual makes an attempt to concentrate efforts on personal priorities and accomplish what they believe to be of greatest importance, doing so by radically changing the form of activity and the structure of life (Baltes, 1997; Heckhausen, 1999, 2001). The adoption of the developmental perspective suggests that midlife crises may play an important role in bringing on a great life change, especially in view of the changing temporal perspective, the increased fear of death, and the related motivation to leave a trace on Earth (Jaques, 1965; Kotre, 1984: Levinson, 1986, Neugarten, 1968). However, research does not confirm the link between age and the occurrence of great life change: a great change may happen at any stage of adult life.

An alternative or complementary interpretation places more emphasis on the creative features of the person (Nęcka, 2005) as well as the creative inspiration present in society and, even broader, in culture. All these elements impact the search for meaningful life and fulfilment; moreover, all these elements promote a social climate fertile for social creativity (see Glăveanu, 2015).

The fact that people find elements of continuity in great life change may result from their attempts in this way to protect their sense of happiness and meaning of life. It is well known that the sense of discontinuity arising out of identity change is negatively related to the sense of happiness (Bluck & Alea, 2008). A great life change may threaten identity itself before its inspiring effects reinforce the renewed identity (Breakwell, 1986). The threat to identity results in a large measure from the necessity of severing part of the network of identity-related ties with other people (for example, by abandoning one's job or family), and increases in direct ratio to the proportion of the social ties

network thus lost. At the same time, the more extensive the network of ties – which provide not only support but also a sense of shared values, preferences, and many aspects of lifestyle – the more smoothly the change proceeds, the smaller its emotional costs are, and the lesser threat it poses to identity. This is so because the change is more likely then to be regarded as continuous rather than abrupt (Iyer, Jetten, & Tsivrikos, 2008). There is strong indication that McAdams is right in maintaining that a person will find it easier to tolerate changes in the environment if convinced of the continuity of the self, but will experience greater difficulties in accepting abrupt changes within the self, regardless of the stability or changeability of the environment.

The problem of continuity and change in human life – both rooted in nature and culture – introduces one of the core features of human being: the *dynamic balance* between stable and unstable aspects of the mind and activity. In existential terms, it has been recently named "dwelling-mobility" (Todres & Galvin, 2010). Dwelling refers to continuity and mobility refers to change – both necessary for human development. Mobility refers also to life creativity; however, creativity involves not only changes but also a sociocultural framework for them. Thus, only a dynamic balance between stability and change, between dwelling and mobility, guarantees a creative individual and creative social life.

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21

Changing One's Foodway: Creativity as Repositioning

Fabienne Gfeller

Introduction

Winnicott once gave as example cooking sausages in order to illustrate that even the most daily activities can be creative, a notion that he linked directly with the idea of a life worth living (Winnicott, 1986). In the present chapter, I will draw on a slightly different theorization of creativity; nevertheless, I share his view that creativity can characterize the most mundane activities, and notably those linked to food and nutrition. In opposition to the widely shared belief that creativity is an exceptional and rare characteristic of human beings or human activities, I do not consider creativity in foodway as the icing on the cake of food-linked activities, but as a central issue insofar it is related to the challenges raised by the food production and consumption system. I frame the "necessity" of creativity in more social terms than Winnicott in his text "Living creatively" (1986), without nevertheless denying its importance for individual development. Starting from this framing, I propose to combine Glăveanu's (2012, 2015) work on creativity with Benson's (2001) work on the self as a locative system in order to conceptualize creativity as a (re)positioning process, and, thus, as social creativity. In the second part of the chapter, I will illustrate through a case study how this theoretical combination allows us to capture the dynamics of change in foodway, by analyzing the story of a young man who radically changed his nutritional habits after an injury. I will argue

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that this theoretical proposition is a way to take into account the social (and cultural) dimension within the individual trajectory of change in food habits and representations. Thus the creativity studied here is social in at least two ways; firstly, because the conditions that trigger it concern broadly how we do live together (ethically and sustainably) as human beings with other living beings on this planet. Secondly, the positioning process I refer to is by nature relational, and if creativity can be understood as a (re)positioning process, this implies that it is by excellence a social and psychological phenomenon.

Food as a Challenge

Eating is a daily activity that concerns everyone and, at the same time, links every person to a large and complex system of food production but also of representations (Anderson, 2005; Di Giovine & Brulotte, 2014). Far from being merely a technical question of how to produce enough for everyone and what to eat in order to be healthy, the food topic involves political, economic, emotional, social and cultural dimensions (see, e.g., Forney, 2013; Mintz, 1996). In this broad field, the consumption of products of animal origin raises particularly vivid debates (see, e.g., Belasco, 2006; Spencer, 2000). We identify three main groups of issues related to food that participate to making it a currently challenging topic; these are the environmental impact, animal ethics, and the health issue.

The role played by food production in climate change is largely recognized. Certain reports evaluate that livestock farming is responsible for 18% of climate change. What makes animals a particularly problematic aspect is not so much the gazes they are directly responsible for, but the impact of the vegetables produced to feed them and their transportation. Moreover, livestock farming is also linked to deforestation (Steinfeld et al., 2006). These issues are not isolated in the expert debates. In the Swiss context, in which the study presented below took place and which can be characterized as part of the WEIRD world (western, educated, industrialized, rich and democratic; see Henrich, Heine, & Norenzayan, 2010), this topic has also been extensively covered within the media during the last years, and is increasingly present in lay journals, advertisement, and through labels appearing in the supermarkets. Restaurants propose more explicitly vegetarian labeled dishes, advancing the argument that it is more environmental friendly. In this context, everyone is confronted with the ecological implications of his or her food choices.

But the ecological impact is not the only "hot" topic linked to food. The way animals are treated, especially in industrial production, is regularly a subject of scandal. Shocking pictures of horses and headlines about the treatments of pigs in the Swiss industry, for instance, was placed on the cover page of well-known journals during the last months, while the organization PEA broadcasted images filmed by infiltrating slaughterhouses. Issues raised here are usually called animal ethics, and are linked to the question of how we should treat animals, including "are we allowed to kill them"? The anti-speciesism movement represents a radical answer to this question, claiming that animals should be considered as the equals of human beings and, therefore, any exploitation of animals should be ended. Even though very few people would take this radical stance in the context of this study, it is not common to say that one doesn't care about how animals are treated. This is also an object of research for academics, who study for example the relation between humans and animals or the evolution of the treatment of animals (Mouret, 2012; Poulain, 2007).

What is a healthy diet is the third issue that is currently present in debates (see e.g. Campbell & Campbell, 2005). The Food and Agriculture Organization for the United Nations recommended for people living in Western countries to diminish the consumption of products of animal origin, linking it with a higher risk of cancer and diabetes (Steinfeld et al., 2006). This topic seems to be linked to a deep-rooted fear about poisoning, which is particularly strong and visible in situations of food scandals (Levenstein, 2012). Less spectacular but maybe more pervasive is a strong wish of control of what is swallowed. Some researchers propose the term orthorexia to designate a pathological extreme of this need of control (Denoux, 2014). More globally, any group shares some representations about what is food, and how to prepare and eat it, with categories as good/bad or pure/impure, going beyond what is actually edible (see, e.g., Douglas, 1966; Lewin, 1943).

Food Related Issues and Creativity

Why is creativity a particularly useful notion in order to develop a contribution from the field of psychology to these issues related to food? In its current forms and dynamics, the food production and consumption system is not sustainable (Garrouste & Mitralias, 2013), which means that innovative solution are needed. Indeed, the situation, as the result of a long history of human activity and of relations between humans, animals and the environment, is specific in many of its dimensions (growth of world population, increase in

meat consumption, neoliberal ideology, etc. see e.g. Celka, 2009; Ziegler, 2011) and there is therefore no known solution simply available to apply. In this sense, the situation can be seen as requiring creativity, if we follow the idea that a problem without learned or practiced solution requires creativity (Torrance, 1988) or, more broadly, that a world of change as the one in which we live makes creativity more present and important (Runco, 2004). Although the definition of creativity is subject to controversy among researcher, it can be broadly defined as a production (of an idea, an outcome) that is both novel (or original) and valuable (or considered as appropriate by some community) (see Runco, 2004; Sawyer, 2003). This corresponds, I argue, to what is needed in response to the issues of food production and consumption: the solutions need to be new in order to respond to the historical specific features of the challenges, and they need to be valuable, which in this particular case means that they both need to be socially recognized by others (in order to extend, which, given the complexity of the system and of the challenges, is required in order to be considered as a – even partial – solution) and they need to address efficiently a certain number of (e.g., technical, material or economic) constrains.

Given the multiplicity of actors involved, innovation could arise in this system through different ways and at different levels. I already announced I would present here a case study of a man who changed his nutritional habits. Regarding the food system, this person holds the role of a consumer, a role in which people might develop innovative practices and to some extent introduce change in the system (Counihan & Siniscalchi, 2014). Indeed, if the issues mentioned above concern an international and very complex system going largely beyond individuals; people take part, resist, depend on and try to change these macro dynamics. Though we have to be careful with the idea of responsibility of the consumer, which increased in importance over the last decades in relation with a neoliberal ideology (Austgulen, 2014), I start here from an understanding of the human being as a potentially reflective and future oriented agent (Valsiner, 2014) able to, to some extent, think about the production system and the meaning, impact and consequences of his or her food behavior. This choice of focus also relies on the observation that the individual level is often left aside in studies on food change (Farquhar, 2006). This level implies both practices (buying, cooking, eating…) and representations (what is edible and for whom, what is good or bad food,…), which is captured by the notion of foodway (Di Giovine & Brulotte, 2014).

Nevertheless, the risk with an approach focused on the individual is to forget the socio-cultural environment in which people live, and the extent to

which this environment shapes them. This is why I draw here on socio-cultural psychology, which aims to take into account the role of the social and cultural dimension in psychological processes, as well as their historicity and materiality (Connery, John-Steiner, & Marjanovic-Shane, 2010; Valsiner, 2014; Vygotsky, 1978). The relation between the individual and his/her socio-cultural environment is that of a dynamic co-construction (Shweder, 1991). While taking in account the importance of the sociocultural environment in the development, the practices and the representations of each person, the socio-cultural approach considers the person as an agent possibly able to take distance from this environment and what is considered as "normal" in it (e.g., consuming meat), and maybe resist it and introduce some alternatives. In the case of food, taking in account this co-construction is fundamental as we know that every human being is socialized into certain food habits, first through his/her closer family and caretakers (Ishiguro, 2016; Ochs, Pontecorvo, & Fasulo, 1996), then more broadly through the groups he or she is part of (Scott, 2009). Any group or society shares some representations about what is proper food and for whom (Douglas, 1966; Lewin, 1943; Montanari, 2010). However, individuals are also, in certain conditions, able participate to the elaboration "new cultural forms" (Awad & Wagoner, 2015, p. 229). We might think, for example, about the reappropriation of food production (Wallimann, 2015) or the creation of new recipes. According to this approach, creativity is always social, nevertheless this statement might have slightly different meanings. First of all, creativity is "developmentally" social. Any higher psychological function, including the processes involved in creativity, is the result of the internalization of processes that took place first on an interpersonal (or interpsychological) level, and is, in that sense, social in its origin (Vygotsky, 1978). Secondly, and this is more central to my argument here, creativity is "dialogically" social, as it builds on others' productions and is always directed toward an (even implicit or abstract) audience (Csikszentmihalyi, 2014; Glăveanu, 2015; Martin, 2016).

Drawing on this socio-cultural approach, Glăveanu defines

> creativity […] as a complex socio-cultural-psychological process that, through working with 'culturally impregnated' materials within an intersubjective space, leads to the generation of artifacts that are evaluated as new and significant by one or more persons or communities at a given time. (Glăveanu, 2010)

Moreover, Glăveanu proposes to speak about the actor of a creative action, as "referring to actors acknowledges people as socialized selves, as beings that are shaped by a sociocultural context and act from within it, in

coordination with others, to change and mould this context in suitable ways" (Glăveanu, 2013, p. 72). These definitions encompass many of the dimensions discussed above. They subscribe to the general agreement that creativity is about what is new (novelty) and what is valuable or appropriate, while insisting much on the social dynamics, the cultural embeddedness, the material component, the temporal dimension and the role of the individual as a source of innovation. In addition to this, Glăveanu's work includes several other theoretical contributions on creativity that are relevant for the study of foodways. Notably, he proposes the interaction between self and other, between object and sign, and between past, present and future as the basic unit of analysis of creative acts (Glăveanu & Gillespie, 2015). This unit allows to address different levels of creativity (that have been, for example, partitioned as mini-c, little-c-, pro-c and Big-C by Kaufman & Beghetto, 2009) within one single model, resisting the pervasive idea that more mundane acts of creation are less important or valuable. This is a crucial point if we consider the links between everyday creativity and mental health (Rogers, 1954; Winnicott, 1986) or happiness (Csikszentmihalyi, 1991). Buying, preparing and eating food are daily activities in which one would not expect to find creativity if considered from the Big-C creativity point of view. Reconsidering the interest of mundane acts of creation goes together with rethinking the links between habits and creativity (Glăveanu, 2012), and this constitutes yet another reason which makes this approach particularly relevant here. Indeed, creativity is considered as anchored in habits rather than opposed to them (Glăveanu, 2012; see also Epstein, 1991 for a discussion of novelty in behavior according to the behaviorist tradition), and one of the characteristics of foodways is their habitual dimension (Lewin, 1943). This approach also considers creativity as a situated phenomenon, and therefore studies specific creative acts situated in time and space (see Glăveanu, 2011; Tanggaard, 2013), which, in the present case resonates with the necessity to take into account the specific current food production system with its problems, constrains and possibilities. Finally, the socio-cultural approach allows considering creativity both at the level of representation, under the form of meaning-making processes, and at the level of practices, in other words its socio-material form, both being tightly linked, which permits to address foodways as the unity between the two. However, if a socio-cultural approach acknowledges the fundamental social and cultural nature of the phenomena under study, we may ask how it can be taken into account in a specific study. This is where I turn to Benson and his idea of the self as a locative system.

Benson's Theory of Self as a Locative System

"Location is the ontological condition for all human being. Not to be in place is to be nowhere, and to be nowhere is to be nothing" (Benson, 2001, p. 10) This implies that there is a fundamental link between where, when and who we are. One of the most important characteristics of the self is that it functions as a locative system that allows us to orient ourselves both physically and symbolically and to navigate the worlds we live in. Understanding this navigation implies understanding the topography of the environment, which is always plural. The key systems are space, time, the moral universe and the social place (see p. 99). These worlds are social and cultural as they are shared with the groups to which we belong, for example we go to the same supermarkets, speak with our neighbours about the quality of the chicken bought at the market, hear in the newspaper about bird flu or see cows when we go to the countryside. Not only are they shared but, through interactions, they are continually reconstructed. At the same time, the perception of these worlds is subjective as each person will experience them from the point of view of his/her own location, anchored in his/her body, encounter some of its aspects and not others, but also experience each aspect according to his/her own story, beliefs and expectations. So if "understanding the navigational strategies of people in symbolic worlds means understanding the local topographies of meaning of their communities and culture" (Benson, 2001, p. 25), there is also subjectivity in the perception and the navigation of these worlds.

And not only there is subjectivity, but also responsibility and creativity, which are socially constructed, attributed and negotiated. At these levels, i.e. the level of social interaction implying the negotiation of responsibilities and assumptions of creativity and the level of the construction of a personal life-narrative including these same elements, the navigation can be understood as a positioning process. Language and discourses are key elements of this positioning, as they both allow to attribute and contest responsibility and rights in social interactions, and to make sense of oneself through autobiographic narrative practices (see also Harre, Moghaddam, Cairnie, Rothbart, & Sabat, 2009). In this more symbolic navigation, the "I" plays a central role in the feeling of ownership, authorship, morality and desire. With these notions comes the question of responsibility. "Self-responsibility entails a compelling feeling that I should or should not do something because it is 'right' or 'wrong', because it is how 'I' should act if I am to be authentically 'the person I am'" (Benson, 2010, p. 132). The human worlds navigated are not neutral lists of places or meanings, but dynamic fields full of tensions, emotions and issues of

power and freedom, in which every person is positioning himself, is interactively positioned by others and attributes positions to others, conveying attributions of rights and responsibilities (Benson, 2010).

My theoretical proposition is to consider creativity as a matter of positioning oneself in socially shared but subjectively experienced worlds. Different positions imply different perspectives, and the ability to change perspective can be considered as a fundamental dynamic in the emergence of novelty (Glăveanu, 2015; Martin, 2016). This combination constitutes the analytical tool allowing to "capture" the socio-cultural environment that is or becomes subjectively relevant to the individual in the creative process. In the following, I will draw on this combination to analyze a trajectory of a person changing his foodway.

Presentation of the Data

The case study presented here is an analysis of the story of Alexander, who progressively eliminated almost any product of animal origin over the last few years. The data was collected in the frame of a research project on vegetarianism. Alexander's case was selected for the deepness and broadness of his change. I conducted a narrative interview aiming to gather information about the unfolding of changes over time. As in a classical narrative interview (Schütze, 1983), the participant was asked to tell his story; nevertheless, the opening question included the request to focus on food. The second step consisted of clarification questions, and finally some predefined questions, based on literature about food and about life trajectories, were added if these issues had not been mentioned yet. This interview was completed by a qualitative experiment in which participants were asked to read statements related to the topic of food of animal origin, and to react to it. This experiment is based on the dialogical assumption that our thinking and what we say is always part of a wider dialogue (de Saint-Laurent, 2018; Linell, 2009), and that speaking or acting is taking position in wider, socially shared debates (Benson, 2010; Harre et al., 2009). The goal of this experiment is to observe the positioning work done towards some selected issues. Finally, I did a video recorded observation of a moment during which the participant was cooking, coupled with elicitation questions, in order to get closer to the person's practices. In the following analysis, I mainly draw on the narrative interview, but the two other sources of information where also carefully considered as complements.

I will first introduce some elements of context before moving to the presentation of Alexander's story. On average, a person living in Switzerland

consumes 246 kg of dairy products (excluding butter) and 49 kg of meat (excluding fish) a year.[1] In 2014, the average consumption of each person was 533 kg of products of vegetal origin and 324 kg of products of animal origin. The average consumption of meat, fish and seafood was rather stable between 2007 and 2017, with a small decrease of 1.1 kg/person (Meyre, 2017, p. 25). Slightly more than 53% of the population declares eating meat every day, while only 1.9% of men and 5.5% of women declare eating meat less than once a week. Among them, 1.3% of men and 3.9% of women declare never eating meat (Meyre, 2017, p. 29). This illustrates that Alexander lives in a context where the consumption of meat, fish and dairy products is the norm, and vegetarianism is a clearly marginal phenomenon. Nevertheless, I could observe the increase of "vegetarian" or "vegan" brands and labels on the market, which reflects economical interests in products free of meat or even of any product of animal origin, and probably also an evolution of the consumers' interests.

Alexander is a men, 31 years old, living in a small village in Switzerland. He starts his narration presenting the situation before what he identifies as the trigger of his change. He grew up on his parents' farm, consuming dairy products and meat on a daily basis, mostly produced from the animals they raised. Practicing sports is an important part of his life, especially football. He sees himself as not reflexive on his eating habits during this period, except that he avoids drinking alcohol. What he presents as the starting point of the change in his foodway is a knee injury that led to a chirurgical operation. After the intervention, the pain continues for a quite long time, and Alexander starts to wonder how to accelerate the healing. An acquaintance tells him that dairy products may cause inflammations of the joints; he therefore starts to avoid them, notices an improvement and decides to carry on. Continuing to gather information from books and the Internet about nutrition, he also starts to avoid meat, for the reason that it participates to elevating the level of acidity in the body. He learns that Novak Djokovic[2] follows a vegan diet and reads a book written by a long distance runner (he changed in the meantime from football to running), which motivates him in this direction. His closer environment seems less encouraging, as he tells in the interview that what he really found difficult is not to be understood by his friends, who would say that he is crazy to stop eating meat while practicing sport so intensively. Nevertheless, he finds some supportive interlocutor in his chiropractor, who is herself a

[1] Data for 2015 available on the website of the Federal Statistical Office: https://www.bfs.admin.ch/bfs/fr/home/statistiques/agriculture-sylviculture/alimentation/consommation-sante.assetdetail.3524750.html, 28/11/2017.

[2] Famous and successful contemporary tennis player.

vegan for several years and with whom he discusses his reflections, recipes and trials. Going further in this research of a healthy diet, he begins to favor raw food and adapts his way of eating (he chews for longer time in order to facilitate the digestion). This has consequences on his whole daily organization as he takes now more time for meals. He also starts to avoid gluten and, for some time, white sugar, which he presents as difficult because he loves chocolate. In order to overcome that difficulty, he makes a gamble with his brother not to eat sugar for one month. In parallel, he is also asked for nutritional advice by a friend who is overweight.

His narration does not only include elements about health. Progressively, Alexander learns and begins to reflect on the environmental impact of food, and to some extend about the treatment of animals in the food industry. He favours local and organic food, underlining the impact on health and on the environment. He starts to buy food directly at the local farm, for the reason that, in the supermarket, the aesthetic aspects of products prevail over the quality, but also for financial reasons, as he says that buying organic local food is less expensive when going directly to the farm. His reflection and change go beyond food, questioning what a good pace for living is. He takes distance from the behaviours he observes around him, criticizes people's lake of time and of awareness about nutrition and the environment.

Creative Changes in the Foodway

The change in Alexander's foodway is quite important and takes place over several years. What exactly allows us to qualify this change as "creative"? If we come back to the definition of creativity as characterized by novelty and value, the creativity we observe here at an individual level is primarily a form of habitual and improvisational, everyday creativity. We can note that there is novelty in practices, as Alexander develops new recipes, buys different products in other places than before, prepares them in a way that he was not used to from before, and even change his way of eating by chewing for longer time. He acquires knowledge about different ingredients and their effect on the body, which leads him to carefully select the components of his meals. He doesn't follow one diet he found as a clear set of rules, but creates his own diet by combining information and know-how from different sources. There is also novelty in terms of identity and social relations. He is now recognized and treated by one of his friends as a kind of food expert, a resource for nutritional advices, but he is also identified by others as a crazy person who stopped eating meat while practicing sport intensively. Evaluating if this is valuable

leads us to ask "valuable according to what"? Again, we have to resituate this question in the context of the case. Alexander had first of all troubles with his knee, that lead him to a general concern for healthy food. Secondly, he cares about the environmental impact and to a lower degree for the treatment of animals. His knee is now completely healed, he is satisfied about his physical conditions and the changes he made allow him to have a behavior that fits better with his environmental and ethical considerations. Therefore, we can say that the change fulfils the value as well as the novelty criterion, and this is why I label it as "creative".

If we move now towards understanding this creative change in Bensionan terms, we might want to describe the world navigated by Alexander, as it is subjectively relevant to him when it comes to the food topic. We notice several changes both in the content of this world and in how Alexander relates to this content. Figure 21.1 illustrates the elements present in the period before the knee injury, Fig. 21.2 assembles the elements becoming relevant after this injury.[3] These are organized around four themes that seemed to serve as grounding elements in Alexander narration. What appears first is the increase in the number of elements. This might be partly for narrative reasons, but some elements clearly become relevant during this transition, and were not before, as, for example, the consumption of raw food, his understanding of the impact of dairy products on joints and the environmental impact of food. This doesn't mean he never ate raw food before or that dairy products had no impact on his joints, but these points were not relevant to Alexander, he didn't think about them nor change his practices according to what he knew. Some elements, as for example meat or eating local products, are present in both figures; nevertheless, the relation Alexander has to them also evolves. When he was a child and adolescent, he says, he used to eat meat with his family, coming

Fig. 21.1 Food landscape before injury

[3] Those figures were constructed based on a thematic analysis (Braun & Clarke, 2006) in which I coded separately elements mentioned in parts of the interview referring to life segments before the injury and elements mentioned in parts of the interview referring to periods after the injury.

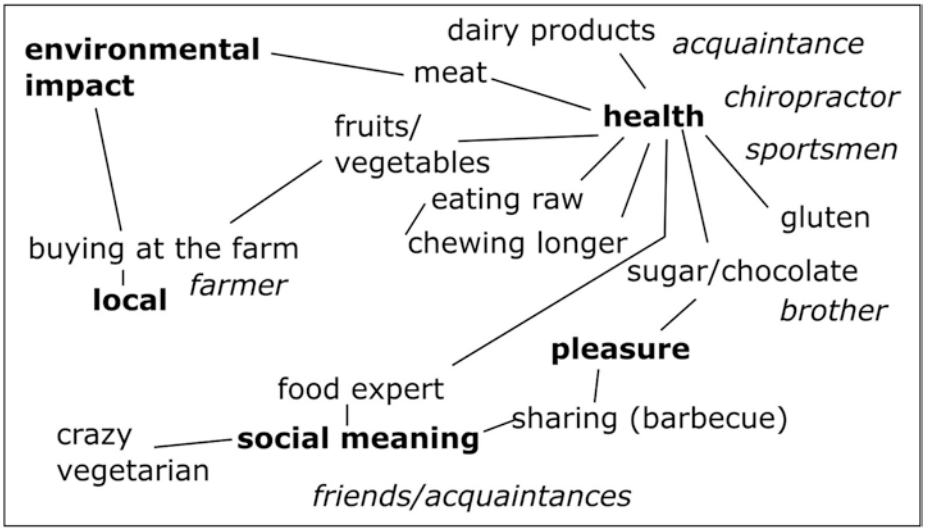

Fig. 21.2 Food landscape after injury

from animals they raised on their farm. He simply ate what came on his plate. Eating meat and eating local only become issues for him later, when he learns about the impact of different food on physical performance, and starts to worry about their ecological impact. Moreover, the fact that he has now to buy the food by himself and that they do not have cows at his parents' place anymore certainly pushes him into a new position of responsibility of consumer, where he has to make choices he didn't meet before. The meaning of eating meat changes, as it is now attached to health issues, and this new meaning goes with a change of practices (avoiding meat). The relation to "local food" also evolves, going from merely statement or feeling of evidence ("we had cows we slaughtered to sell meat so of course we also ate it", Alexander says) to a claimed choice linked to ecological reasons, in other words to an explicit positioning. This question of meaning leads us to the observation that the change cannot only be described in terms of what is or is not relevant to the person at a certain point, but how he relates to the different elements and understands them (which includes how he understands the relations between these different elements), in other words how he positions himself towards them. None of these elements is "neutral", Alexander is always in a certain relation to them, considering them as good or bad (for several reasons, be it their environmental impact or for health reasons), more or less important than others (e.g., buying oranges is not optimal because they come for fare away, but they are important for nutritional reasons so he would still buy

them, but he buys them organic which minimizes the negative value linked to the environmental impact). Moreover, there is not only a quantitative rise of the number of elements, but also a more complex and detailed understanding by Alexander of certain points as, for example, the link between local choices and the global environment.

Finally, we can notice several persons who played an important role in the change, all of them having their own positions. In particular, the person who tells him about the link between dairy products and inflammations of joints acts as a key in the evolution, opening a new field of reflections to Alexander. Many other people are mentioned in his narration, e.g., the chiropractor, the farmer, his parents, the friend asking for advices, the brother with whom he made a gamble or the sportsmen who are source of inspiration. We can notice that the role they play in Alexander's change is variable. Some of them are resources supporting the ongoing change, some question it and make it difficult, some provoke new changes or reflections. Also, not all of them are people he directly meets, it might be an encounter mediated by a book or a television program. Even more broadly, this whole landscape and its evolution is in dialogue with socially shared discourses about health, environment or what it is to be a responsible consumer. Indeed, we can observe that none of the themes which are important in Alexander's food landscape are absent from the current debates about food in the media presented at the beginning of this chapter. So the positioning is not only an abstract process towards some issues, but is also and always taking place in dialogue with other people and socially shared discourses mediated e.g. by mass-media (see also Gillespie & Martin, 2014). This echoes with researches from the field of life course studies, which showed in a similar way the importance of social dynamics in life-creativity (Zittoun & de Saint-Laurent, 2015).

Conclusion

In this chapter, I had the ambition to contribute to the understanding of creativity through a theoretical proposition applied to a case study. I proposed to combine Glăveanu's and Benson's work, in order to generate a framework that would allow me to describe the socio-cultural world of a person's change of foodway and the creativity associated with this change. I used this combination to analyse a case study on a topic that, I argued, is in need of creative change as it faces several complex and urgent challenges, namely food production and consumption. Through the analysis of Alexander's story, I analysed

why the change in his foodway can be considered as creative, how this creative change can be described as a change in the world he subjectively navigates and, finally, I highlighted the role of other people in this change and, more broadly, how this is embedded in debates shared on a broader social level.

In conclusion, positioning appears to be a central notion in the study of social and everyday creativity, therefore I will close this chapter with some points of discussion around this notion, the first being the question of whether it is relevant to consider creativity as positioning, repositioning or even the creation of a new position? Drawing on this case study, I would point the fact that Alexander doesn't "simply" adopt an existing diet, but explores the topic (both on a theoretical and practical level) and makes his own trials and combinations. It is not a case of moving to any existing position, but he elaborates his own combination, which indicates the creation of a new position (even though the next question would be if it is one position, or several). The second point of reflection is linked to the question of the cumulative nature of positions. The trials and progressive change seem to indicate the importance of being able to move to another position or adapting one's position. Indeed, in order to move to a new position, he must to some extend abandon another one. Even though he can keep remembering what it is to be a meat eater, and even come back to it from time to time or in a more stable manner, there is a kind of exclusiveness between certain positions. This reflection is certainly far from exhaustive, nevertheless my aim here is to avoid the risk of communicating the idea that the change studied here is merely a cumulative process. The balance between holding a position and moving from it in the development of positioning and of the general landscape would need some further study. Martin's Life positioning analysis of Jim Thorpe's life (Martin, 2013) and Gillespie's analysis of the autobiography of Malcolm X (Gillespie, 2005) highlight with slightly different theoretical backgrounds the complexity of these processes taking place simultaneously at the societal, ontogenetic and microgenetic level, as well as the difficulties that might appear for an individual linked to some positions or due to the relation between several positions. Finally, another point that should be taken carefully is the individual's responsibility. With a focus on a single person's creativity, we might (unwillingly) give too much weight to the person's responsibility in dynamics that largely exceed him, as in the case of climate change. This is a delicate question, and if it is important to consider the individual as a responsible and reflective agent, this should not lead to underestimate other levels, and acknowledging the social embeddedness of the processes under study is a key step in that direction.

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22

Behind the Scenes: How to Research Creative Processes in Multidisciplinary Groups

Ingunn Johanne Ness

Introduction

In this chapter, I will report from an ethnographic study on creative processes in multidisciplinary groups working with developing innovative ideas. The focus of the chapter is on the methodological procedures used, highlighting the "behind the scenes" of conducting research. An ethnographic approach was used to study real world innovation and how specialists from different disciplines develop innovative ideas in collaboration. Consequently, this project is positioned within a sociocultural approach, which implies a focus on the processes and co-construction of ideas between the group members.

In this chapter I present briefly two studies that I conducted as part of a larger research project undertaken in knowledge intensive organizations. In the first study, I investigated what characterized creative processes in multidisciplinary groups aiming to develop innovative ideas and the patterns that could be identified. In the second study, I investigated further how knowledge was built at the boundaries between different disciplines in multidisciplinary groups. I will begin by presenting some background for the project, including a brief description of the sociocultural approach. I will outline the ethnographic research design used and, finally, reflect on some of the methodological and ethical challenges involved in conducting research in confidential innovation contexts.

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Background for the Project

Creativity and innovation research is a field that is receiving an increasing amount of attention in organizations due to their importance for rapidly changing market economies. In order for organizations to develop innovative ideas, a common strategy leaders use is to establish multidisciplinary groups. Such groups consist of people with different and highly specialized expertise from different disciplines who are brought together to share and create knowledge and innovative ideas and solutions.

In response to this increased interest for creativity and innovation in organizations, a lot of research on organizational creativity has been conducted. An overview of such studies reveals that the main view of creativity focuses on individual views and individual traits (Amabile, 1996, 2008; Barron & Harrington, 1981; Feist, 1998). As a result, creativity as a collective phenomenon, in groups, needs to be investigated more closely. In addition, in terms of organizational creativity as a collective phenomenon, a strict separation between the social and the individual seemed to fail to account for the relational interdependence of group members. Recognition of these knowledge gaps meant that collective creativity in collaborative work has been increasingly present on the research agenda for some time (Hargadon & Bechky, 2006; John-Steiner, 2000; Kurtzberg & Amabile, 2001; Sawyer, 2006).

Based on this background, I follow the sociocultural premises suggested by John-Steiner (2000), Sawyer (2003) and Glăveanu (2010) and focus on the dynamic between the group and the individual. Thus, the research project presented here examines the relational aspects involved when group members aim to develop innovative ideas for their organizations.

Organizational creativity can be defined as "the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system" (Woodman, Sawyer, & Griffin, 1993, p. 293). In this project, creativity is also understood as a collaborative process (Moran, 2010) in which the members of the community produce a new and useful output – this might be an idea, understanding or solution – for the group or wider community (Hämäläinen & Vähäsantanen, 2011, p. 172).

Bakhtin's concepts of dialog and polyphony were found to be particularly useful to theorize the sociocultural dynamic of groups. Dialogue, according to Bakhtin, is simultaneously a fact of life and an ideal to strive for. For Bakhtin, "dialogue is a combination of voices, it is polyphonic. The voices in a dialogue are persons speaking 'in concert', but a person engaged in a

dialogue is not restricted to one voice" (Graumann, 1990, p. 108). The concept of dialogue is closely connected to the concept of polyphony which is borrowed from music and acknowledges the simultaneous presence of many voices without any voice being superior to the others. Bakhtin's perception of polyphony is normative in the sense that it implies that no authority is dominating, and everybody's voice is equal. His view acknowledges the tension between voices that interaction might lead to. To Bakhtin this implies that participants in a dialogue must be open minded to the others as it is in the tension between different voices that knowledge and meaning are created.

The Research Design

An ethnographic design enabled me to investigate the creative processes in groups, in their dialogical manifestation, and offered me a chance to get close to and capture these processes from the beginning to the end. I was thereby able to identify patterns and characteristics across the groups (Denzin & Lincoln, 2000; Fangen, 2010; Gerson & Horowitz, 2003; Krumsvik, 2014). I was particularly interested in both the social interaction and the communication in the groups and the way the group members used language as a tool in the development of knowledge.

Due to the explorative nature of the project, I chose to start from an open and explorative question in the first study: *What characterized creative processes in groups working with developing innovative ideas and what phenomena and patterns could be identified?* I then moved to a narrower focus in the second study: *How was knowledge and new ideas built at the boundaries between disciplines?*

To enhance the quality of the ethnographic work, I endeavoured to provide detailed and "thick" descriptions of the research setting. Thus, there was a need to have many hours of direct observation as well as field conversations and interviews with group members and the leaders of the groups. The analysis of the ethnographic data was inductive. This means that data were examined to identify and to categorize themes and key issues that emerged from the data. "Through a careful analysis of their data, ethnographers generate tentative theoretical explanations from their empirical work" (Reeves, Kuper, & Hodges, 2008, p. 513). Reflexivity is a central element of ethnographic work, owing to the relationship the ethnographer shares with participants and the ethical issues that are associated with this close relationship.

Context and Selection of Three Multidisciplinary Groups

The context of the research project was development of innovative ideas in groups in two organizations: Statoil ASA (now called Equinor) and a Norwegian research institute. The data were collected in these two organizations. Statoil ASA is an international oil and gas company with offices in 37 countries and approximately 22,000 employees whose primary objectives are exploration and extracting oil and gas resources. The Norwegian Research Institute focuses on applied research in the natural and social sciences.

In the process of identifying research groups, I used a combination of convenience and purposive sampling (Patton, 2002), and contacted organizations that worked with innovative idea development. It was important to get access to groups doing authentic innovation work in order to understand more about organizational creativity.

Three groups were ultimately selected for the research:

The Strategy group: I first gained access to a strategy group based in the international Oil- and Gas company, Statoil.
The Innovation group: The second Statoil group I gained access to was based in their Innovation Department.
The Research Institute group: I gained access to a third group, based in a Norwegian Research Institute.

Key Findings

In order to understand the creative processes in the groups, I spent a great deal of time with the group members collecting data, both video and audio recording of workshops and meetings, but also engaging in field conversations. After some months interacting with the group members, I started to analyze the data, looking for recurring phenomena and patterns.

During these initial analyses in the first study, I discovered that groups' communication patterns and interactions changed over time. At one point the communication was more open, more questions, more creative and imaginative, while other times it seemed as if the communication were more "closing" and not as explorative. As I studied the patterns involved, I found that creative processes seemed to develop throughout six phases of initial innovation work (Ness & Søreide, 2014).

In phase one, the group members were assembled together for the first time and informed about the task by the group leaders. This also included also how

the leaders wanted the group members to collaborate with each other – given the fact that they came from different disciplines and had different expertise. They were provided with a challenge or a "need" to work on and the innovative group work could begin. I called this phase, the "Initiation phase".

After this initial phase, group members started to give presentations and share their individual knowledge related to the task at hand. This generally included sharing discipline-related specific terminologies and it was obvious that the different group members saw matters from very different perspectives and had distributed knowledge, so I called this phase the "Knowledge distribution phase".

Then, when they had shared knowledge in this rather calm and structured way, they started to discuss what they had just shared. Clearly, they disagreed based on their different perspectives and different ways of understanding or communicating matters, so consequently they started to challenge each other's standpoints and views. The many voices blended together and it seemed as if they were participating on equal terms and that no voice were superior to the others. I thus called this the "Polyphony phase" from the musical term and I was also influenced by Bakhtin's notion of dialogism (Bakhtin, 1984; Dysthe, 2001, p. 14). In this phase the group members across the groups also seemed to be quite eager and engaged.

After the group members had been discussing various views, they seemed to start using this shared knowledge in new ways and discussed possible new scenarios and imagined new ways to understand or solve the task at hand. Therefore, I called this phase the "Imagination phase".

These scenarios and new views became increasingly formulated into concrete ideas, in what I called the "Idea formulation phase", before they were finally were consolidated in the last "Consolidation phase" and could be presented as an innovative idea, solution or business case.

When I looked closer at these six phases, I noticed that in the three first phases (initiation, knowledge distribution, and polyphony) the group members seemed to share knowledge and learn from each other. In this way they built a common knowledge platform which was crucial in the actual idea development that took place in the three last phases (imagination, idea formulation, consolidation). It seemed that the more they learned from each other, the more innovative ideas seemed to be developed. Further, I found that the first phases could be seen as input and the concrete ideas and results, as output, and that the most creative part happened in the three middle phases. In the polyphony, imagination, and idea formulation phases, group members challenged each other's views, they disagreed and

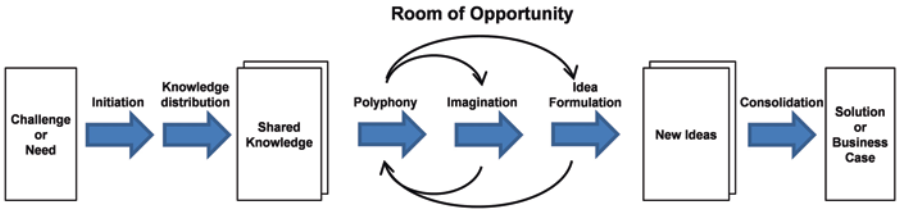

Fig. 22.1 "The Room of Opportunity" edited version (Ness & Søreide, 2014)

negotiated in a circular movement – and pushed the limits of existing knowledge. Thus, I coined these phases, the "Room of Opportunity" (see Fig. 22.1). In this "room", group members co-constructed new ideas and according to Bakhtin it is between voices and in the tension that new ideas are possible.

In the second study, I narrowed the focus to look at how knowledge and ideas were built across boundaries between different disciplines. More specifically, I investigated how multi-disciplinary groups built a common knowledge platform (Ness & Søreide, 2014) and what underlying conditions were needed for this to happen. This study drew on data analyses from observations and focus group interviews from the three groups. In particular, Bakhtin's (1984) term polyphony and Edwards' (2012) term relational expertise were used as analytical tools to discuss the empirical findings.

Findings showed that in the process of constructing a common knowledge platform for enabling innovative ideas, it was necessary for group members with their backgrounds and from different disciplines to have the ability to recognize and acknowledge others' competence and resources in addition to their own special expertise. This ability is what Edwards (2012) refers to as relational expertise. Despite the fact that at this stage in the process there was an urge to challenge each other's views openly this was done in a respectful manner.

In order to construct a foundation for developing ideas, the negotiation of perspectives seemed to imply friction and some disagreement across all groups. To succeeding with the innovation work it seemed crucial that the way the group members saw each other as resources. Three underlying conditions were identified: openness, curiosity, and respect. Thus, my results showed that it is not simply adequate to merely bring together group members from different disciplines, but that successful innovative groups require additional relational competencies in order for the collaboration and learning to succeed.

Behind the Scenes: Conducting the Ethnographic Research

I will now in the following turn to what happened "behind the scenes", namely the methodological procedures involved in data collection and analysis. Finally, I shall conclude this chapter with some reflections on the challenges of fieldwork.

Collecting the Data Material

The data collection in the large project occurred over a period of 18 months. I used a combination of different methods often referred to as *method triangulation* (Krumsvik, 2014, p. 30). The combination between the various methods – participant observation, focus group interviews, and semi-structured qualitative interviews – contributed to generating both broad and in-depth knowledge. Supplementary data such as informal field conversations were also collected to provide background information about the participants' understanding of creative practice in their own disciplines and work experience. These supplementary data were important for my understanding of the field and the context and not analysed directly in this project.

Doing Participant Observation

Participant observation is a common method in ethnographic fieldwork and may involve weeks, months, or even years of intensive work in order for the researcher to become accepted as part of the culture (Eriksson & Kovalainen, 2008). In this project, I aimed to become one of the group members so that I could experience the group work myself and observe ideas develop from beginning to end. For practical reasons, I spent the most time in the Statoil Innovation group and followed workshops and meetings regularly over a 16 months period.

All the observations were open in the sense that the group members were informed of my role and the aims of my project. Even though I often participated in the work along with other group members, my main activity was observing and taking notes. In addition to taking notes, I brought an audio recorder and made recordings of the conversations in all the groups. In the Statoil Innovation group, I also video recorded some of the sessions (Fig. 22.2).

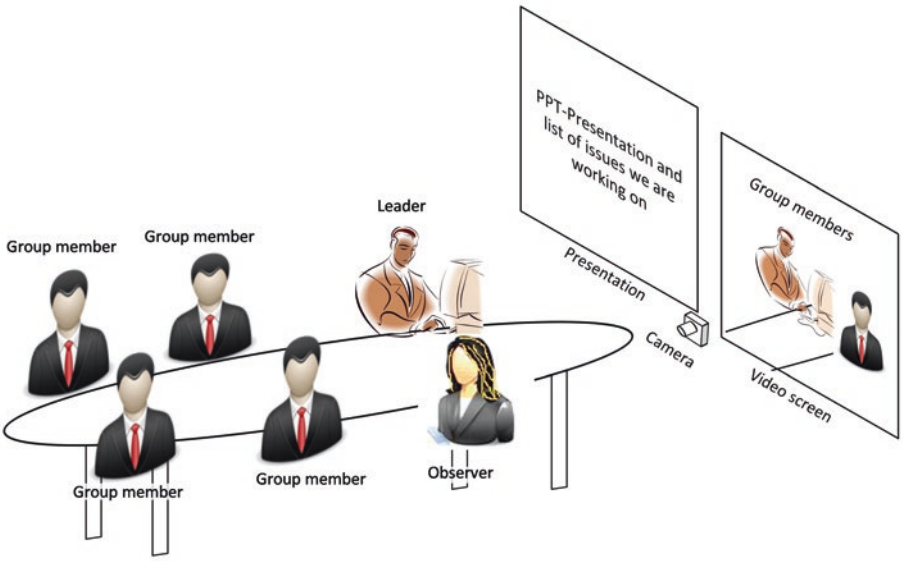

Fig. 22.2 Visualization of an observation in the strategy group

Immediately after each observation, I worked on my field notes and wrote an observation log. In the log, I reflected on both the processes I had observed and made notes on my own role and interpretations of what happened. Whenever possible, I started transcribing the same day when the interactions were still "fresh" in my mind. The analyses of the transcribed observation data served as the foundation for both the focus group interviews and the interviews with leaders that I conducted later.

This particular field of innovation and the technical terms connected to oil industry, was a new arena to me. As such, the fieldwork in the first group, the Strategy group, was challenging. The highly specialized terminology and various abbreviations made it difficult for me to understand what they said and to follow the discussions.

Consequently, the transcriptions also became very time consuming because I also had to spend time finding out what technical systems or issues were referred to so that I could understand their discussions correctly. I felt like I was transcribing a foreign language – especially since I often guessed the spelling of various terms specific to a discipline that I had never heard before. When I tried to google the terms in order to get more information, this proved difficult too – because then I had to know the correct spelling to find the information I needed.

However, when I reflect over the process of doing the transcriptions this thoroughly, I recognize that this was crucial in order for me to understand the content of their discussions and to be able to recognize when they actually were talking about the same systems or issues again. Also, in the Innovation group, a similar challenge lasted for some time due to the highly specialized knowledge they were sharing and the ideas they were developing with many advanced principles involved. To unravel the complexity, I was dependent on both the audio-recordings and the detailed field notes.

Focus Group Interviews

In order to broaden the data material beyond merely observational data, I collected additional data with the help of focus group interviews. They had the additional benefit of helping me to learn more about the group members' own experiences of the process whilst also observing group dynamics during focus group discussions (Hatch, 2002).

In the focus group interviews in both Statoil and the Research Institute, my goal was to find out more about how the group members themselves had experienced the group work and their thoughts on the creative processes. The interview guides for these interviews were based on preliminary findings from the analyses of the observations. I included both open questions as well as presented some specific findings and invited group members to give me feedback. To structure the focus group interviews I found it helpful to use PowerPoint and to show the groups slides with thoughts and questions regarding specific subjects. I also found this use of slides particularly useful in order to maintain a collective focus throughout the interview. The group members were participating eagerly, they were engaged, and it was a challenge in all three focus group interviews to keep the scheduled time since the group members had much lot to say. I often felt that they could have gone on discussing something, when I had to move on to the next subject/question.

Semi-structured Interviews with Leaders

Based on the analyses of the observations and the focus group interviews, I started to see clear patterns of what characterized the creative processes and also received feedback and new insights during the focus group interviews. In addition, I thought it was important to hear directly from the leaders; how they experienced the creative processes from their point of view and what they

thought about how they had facilitated the creative processes. In preparation for the interviews with the leaders, I drafted questions designed to elaborate, and/or validate further, my preliminary findings from these previous analyses. This enabled me to keep a clear focus when I prepared the questions for the interviews with the leaders.

The leader interviews were conducted during a four month period and helped me to gain a deeper understanding of the role of the leaders and how they reflected on the creative processes. I found interviewing the leaders of innovation processes in organizations very useful. I asked them questions both regarding the specific work that was conducted in the groups, but also questions about their leadership vision as well as questions regarding how they saw organizational structure influencing innovation work. I compare these leaders to the people Kvale and Brinkman's (2009) refer to as "elite persons". This has to do with the high status these informants possess as professionals. In order to get rich descriptions, I aimed to be a partner in the dialogue. Disagreement and negotiation about meaning between researcher and informant has the potential of leading to new knowledge and it was interesting to engage in discussions with these leaders, particularly as some of them were also researchers on innovation. Another interesting aspect of this part of the research project was that transcribing the focus group interviews and leader interviews were far easier than transcribing the observations. This was because I was more familiar with the field and terminology but also transcribing questions and answers was less complex than the observations involving simultaneous, ongoing dialogues and activity.

Multiple Analytical Approaches

When I started to analyse the data in the first study with an open and explorative question on characteristics of the creative processes, starting from the observations, it was important for me to approach the data inductively (Hatch, 2002, p. 161; Malterud, 2003, p. 172). I searched for patterns and meaning to help me gain some kind of understanding of the complex material.

Throughout the analyses in the studies, I interpreted the data and created meaning and categories that were not explicit in the text itself. Tables 22.1 and 22.2 below show an overview of the analyses step by step in two different studies. They also provide an overview of the data collected through different methods (for more detailed on each study's specific analyses, see Ness, 2017; Ness & Riese, 2015; Ness & Søreide, 2014).

Table 22.1 Analysis – steps in study 1

Study 1: What characterizes the creative knowledge processes in multidisciplinary groups working with innovation? – What patterns can be identified?	
Analyses: Observation	Analyses: Focus group interviews
Step 1: Categorization: Reading transcriptions and searching for characteristics in the way the group members communicated and interacted and developing categories which describe these characteristics	Step 1: Categorization: Reading transcriptions and searching for more detailed/other characteristics of the creative knowledge processes
Step 2: Searching for changes in the patterns in the communication/ interaction over time (=discovery of different phases)	Step 2: Making a more detailed matrix with characteristics of the creative knowledge processes
Step 3: Coding of the identified categories from step 1 and 2 in excel	Step 3: Writing out a more detailed text describing the characteristics of the creative knowledge processes in each of the six identified phases based on observation data and focus group interview data combined now from all three groups in the same text
Step 4: Making a matrix with identified characteristics and pattern over time (=phases)	
Step 5: Comparing the characteristics in the matrix with the original transcriptions (=recontextualization)	
Step 6: Writing out a preliminary text describing the characteristics of the creative knowledge processes in each of the six identified phases based on observation data	

Analyses of Different Data-Sets

The two studies were guided by two different research questions. Thus, I could analyse the extensive material collected in different ways. In the following, I will describe how I analysed the data material from observations and interviews.

Analyses of the Observations

As the results presented earlier in the chapter shows, I began quite broad to identify what characterized the creative processes with an emphasis on main characteristics and patterns. A sociocultural lens, with a focus on

Table 22.2 Analysis – steps in study 2

Study 2: How is knowledge built at the boundaries between different disciplines?	
Analyses: Observation ⇒	Analyses: Focus group interviews
Step 1: Reading transcripts with the previously identified 6 phases of the creative knowledge processes	Step 1: Categorization Reading transcripts from the focus group interviews and searching for characteristics of how knowledge was built at the boundaries between disciplines
Step 2: Categorization: Searching for characteristics on knowledge development across disciplines and developing categories describing these characteristics	Step 2: Coding of the identified categories in excel
Step 3: Coding of the identified phases and categories in excel	Step 3: Making a matrix with both characteristics of how the group members built knowledge between disciplines and how this took form in the different phases
Step 4: Making a matrix with identified characteristics of how the group members built knowledge between disciplines included the different phases	Step 4: Writing out a text describing the characteristics of how knowledge was built between the disciplines in each of the six identified phases based on observation data and data from focus group interviews from all three groups
Step 5: Writing a preliminary text on the characteristics of how knowledge was built through the phases	

co-construction and social interaction, influenced both what I looked for and how I interpreted the observations made.

This included studying both situations with a supportive climate and situations with a more challenging climate (including disagreement), as well as considering how group members shared knowledge through explaining things out loud, and how visualization and drawing were used to make individual knowledge accessible to the group were also examined. In this way, I extracted the details of how knowledge was built was from the transcripts and was able to make sense of it. Sequences that were identified as being characteristic examples of how knowledge was built across boundaries were considered categories, inspired by Hatch's (2002, pp. 161–179) inductive analyses.

The following is an example of how the Innovation group worked in the Imagination phase. The group members had been sitting around a table, discussing a subject and they were now in the phase where they began to use the

shared knowledge in imagining new ways of doing things and moved to draw on the smart board.

This is an excerpt from a field observation:

> *The group leader draws circles on the smart board. His voice is eager and engaged. Another group member fills in some details and quickly makes room for another group member who indicates that he wants to add something. They are all standing shoulder to shoulder in front of the smart board, all intensely focusing on the drawings. Soon the circles are filled with details representing their individual inputs and ideas, but now visualized as one common drawing.*

When I was analysing the data and looked for how the group members built knowledge and new ideas, I found seven categories (A-G) describing communication and interaction in which knowledge was built across disciplinary boundaries. The categories were: *A. curious state of mind*: communication and interaction where group members seemed open and curious towards each other – both regarding their explicit expertise and competences, but also a curiosity towards each other's motivation, *B. positive comments and laughter* describing communication where group members expressed interest and positive reactions to each other's views and knowledge, *C. explanatory communication* describing communication where group members gave explanations with longer reasoning and detailed information and expressed their specialized knowledge explicitly, *D. friction and challenging communication*: communication where group members more critically questioned each other's views, *E. visualization describing communication* where group members used artefacts or other means to support their verbal communication, *F. facilitation* describing communication where some kind of structure was involved in how group members shared knowledge, and finally, *G. rapid and explorative communication* describing communication where group members built on each other's sentences in a continuous movement including many short statements and with a particular focus and aim (For more, see Ness & Riese, 2015).

An example of a quote that I coded "Category A, Curious state of mind: communication and interaction where group members seem open and curious towards each other" is the following made by Eric the leader of the Innovation group:

> Eric (Innovation group*): I am really curious, I am… because when you said this, Miriam, I get "goose bumps" – it is so exciting to me, I am eager, you have all this "prima" knowledge on this so can you tell me how the (…) can be attached to (…)? [He laughs and gives Miriam a big smile]*

I interpreted this quote as Eric being both curious and interested in Miriam's knowledge and what she had to say. He stated that he got "goose bumps" and he smiled and showed eagerness, interest and expressed the fact that he wanted to learn more**.** Quotes like this that were especially significant in the second study as previously described in the presentation of findings. As my fieldwork progressed, I gained better understanding of the research context and thus I experienced that it was easier in the second study to make sense of the data material collected in the groups compared to the first study.

After making the category descriptions, I transferred the transcribed texts to Excel. Then I coded the texts both with respect to the timeline (chronological sequence number in one column), how the creative processes developed in phases (marked from 1–6 in another column) and categories discussed above (marked as letters, A-G, in yet another column). By using the sorting function in Excel, I could switch between looking at the whole dialogue chronologically, as it happened in the transcriptions, and looking at the extracted dialogue in each phase. This is inspired by a hermeneutical interpretation of meaning (Kvale & Brinkmann, 2009, pp. 213–218) leading to a deeper understanding of the data.

The phases and the categories were then used to make a matrix with the phases indicating a horizontal timeline and the categories placed in the vertical column. This gave me a distilled overview of the complex data describing the creative processes. This matrix of preliminary findings made it possible to see how the characteristics varied from phase to phase. See the example below, in Table 22.3 on the previously described category A, on curious state of mind, and how it varies throughout the phases. Finally, I wrote out a text describing the creative process (recontextualization) based on the categories and how they varied during the phases.

Reflections on Ethnographic Fieldwork

Conducting ethnographic research is time consuming, but I believe that it was still a fruitful way to investigate the creative processes when multidisciplinary group members developed ideas through collaboration. I found it particularly important to get close to the group members and to participate in the work in order to understand the relational conditions involved in the ways they communicated and interacted.

However, as previously mentioned, when I started my fieldwork the groups, I faced some challenges in understanding the highly specialized technological terminology used by the group members. From a hermeneutic point of view,

Table 22.3 Matrix of category A findings in study 2

	Phase 1: Initiation phase	Phase 2: Knowledge distribution phase	Phase 3: Polyphony phase	Phase 4: Imagination phase	Phase 5: Idea formulation phase	Phase 6: Consolidation phase
A. Curious state of mind: Communication and interaction where group members seemed open and curious towards each other – Both regarding their explicit expertise and competences, but also a curiosity towards each other's motivation. Active questions/ eye contact	Introduction of the multi-disciplinary group members Group members seem to listen and make eye contact with each other = openness, diversity	Listening to all the different presentations in the group, nodding, eye contact / visualizations Making notes when other presents Focus on the presenter Sitting quietly, listening, nodding = curious on each other's knowledge = curiosity and interest for what others present	Asking lots of questions Expresses eager to the different mindsets Interruptions, asking questions to ensure correct understanding of what was said Eagerness to understand each other = respectful communication	Less questions regarding the previous presentations Questions directed towards how to see things differently, visualizations	Focus is directed towards how to support ideas other suggest Eagerness to understand the ideas and what the others mean (and not the person as was visible earlier)	Few opening questions Group members seem to be less curious Focus is on getting the idea finalized

there is a problem when we face terminology which is not familiar to us (Taylor, 1998). We must look at the coherence of meaning and action in the particular situation. In this case, I gradually gained familiarity by reading the literature, participating in meetings and lunches, and attending workshops so that I was capable of making meaning of their discussions. I also took courses, which was a requirement both in order to be included in the groups' social culture and but it was also a requirement from Statoil in order to get a key card to the Statoil buildings. Everybody must have their key cards with photos visible at all times in this organization and, consequently, I could walk around in the corridors looking exactly like any other employee. These actions allowed me to explore my research question more freely and ultimately to achieve reliable and valid findings. It was important in terms of the validity in my project, that I actually investigated the creative processes and not something else. It also strengthened the reliability that I was able to understand enough of the terminology and context in order to make sense of and interpret the processes in the groups in accordance with the group members' own perception of what happened.

Interpretation is closely related to reflexivity, which is the mirror of how I as a researcher constructed knowledge during the whole research process. Reflexivity starts by identifying the preconceptions brought into the project by the researcher, representing previous personal and professional experiences, motivation and qualifications for exploring a particular field (Malterud, 2001, p. 484). As part of doing the ethnographic fieldwork, I reflected on my motivation and qualifications for exploring the creative processes in this chosen field. I had a personal motivation and interest in creativity and was curious about how different knowledge sets and perspectives combined can lead to new ideas. My educational background – in addition to working experience with multidisciplinary groups in an Entrepreneur company – guided my focus towards the relational aspects and interaction in the groups. The combined "package" helped me to understand the way the group members worked with idea development together. These factors influenced both what I looked for and saw, as well as how I interpreted it, but it also gave me credibility in identifying and understanding the processes I wanted to investigate.

Reflections on Ethics and Its Challenges

In general, there are several ethical considerations involved in research; informed consent, confidentiality, and the role of the researcher (Kvale & Brinkmann, 2009). All of these are important and prior to starting the

fieldwork, I got the project plan accepted by NSD (Norwegian Centre for Research Data).

Informed Consent

Conducting fieldwork has challenges both in terms of the fact that it is time consuming and that it requires an ability of the researcher to be able to build trust with the informants. An important part of gaining trust was to be as transparent as I could and to let the group members know why I was there and what I was studying. Informants need sufficient information to gain a reasonable understanding of the research in question, of the consequences of participating in the research project, and of the purpose of the research, and also that they have the right to withdraw from participating at any time (Forskningsetiske-komiteer, 2006, p. 12).

I did, however, face a dilemma connected to the ethical principle on informed consent on one hand and not disturbing the processes I aimed to investigate on the other hand. Also, sometimes it could be difficult to make sure that everybody had truly consented. In fieldwork there is less control of the setting compared to for instance many quantitative studies. The flow of the interaction is broader as well as being more reciprocal and open-ended (Forskningsetiske-komiteer, 2006). For instance, when I participated in meetings in the Strategy group in Statoil, these meetings were mostly structured as video conferences and new people tended to come and go.

In the beginning, I stopped the meetings and informed the new person about my presence, my research, and asked for an informed consent. However, this tended to then divert the focus from their discussions' focus and I realized that my presence disturbed the flow in the creative processes. After talking to the group leader, we agreed to leave the timing of informing newcomers to the group leader's best judgement.

Confidentiality Versus Transparency

It would be very unfortunate, to say the least, if sensitive information was revealed through my studies and reached competing organizations. Therefore, I had to be very careful in how I both stored and used the data. Needless to say, I felt an enormous responsibility in how I processed these sensitive data. Interestingly, this extreme business sensitivity proved later to be challenge when it came to reporting and using quotes to help demonstrate how the innovative ideas were developed. It was difficult to both keep confidentiality

agreements and at the same time be fully transparent and expose every step of my research path. Transparency allows others to see and understand what is done in the research during the whole process. Also, how the groups communicate through certain procedures can in some cases be secret so this aspect of my research remained to be one of the main challenges in the project.

On this note, a reflection to be made is how restrictions in extensive confidentiality agreements actually can threaten verifiability and might undermine the obligation the researcher has to document both sources and results. Alver and Øyen (2007, p. 24) claim that when trying to keep to the ethical principles on confidentiality and anonymity, one must still be careful and not to write a story which differs from what actually happened. I addressed this in the reporting of findings in articles, for instance, by using some quotes and thick descriptions from dialogues in observations and interviews, but in the quotes that contained confidential information, I often used (…). Since my research question was about what characterizes the creative processes in groups working with innovation, this had more to do with *how* they worked than *what* concrete innovative ideas they developed.

Concluding Remarks

In this chapter, I reported data from an ethnographic study on creative processes in multidisciplinary groups working with developing innovative ideas and focused, in particular, on what happened "behind the scene" with respect to the methodological procedures used. An ethnographic design enabled me to capture the creative processes from the beginning to the end, and thereby identify patterns and characteristics across the groups in situ (Denzin & Lincoln, 2000; Fangen, 2010; Gerson & Horowitz, 2003; Krumsvik, 2014). The chapter has presented key findings and given an account for practical method procedures and analyses. I have aimed to be as transparent as possible, to show the various steps in both data collection and in how the data were analysed. I have also drawn attention to some of the challenges I faced during this research project. I ended with a discussion of researcher reflexivity and some observations regarding the ethical challenges involved in doing research in highly confidential innovation settings. Hopefully, taken together, these reflections will be useful for all those interested to understand how groups work together, how ideas develop in time through dialogue, and how ethnographic methods can be used to examine creativity as a social phenomenon.

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23

Creative Culture Analysis: A Way to Understand How an Environment Is (or Isn't) Favorable to Creative Ideas

Asdrúbal Borges Formiga Sobrinho

Introduction: First Steps in Building a Potentially Creative Culture

This chapter is based on the assumption that creativity should be investigated by considering the relations between person and environment (Barron, 1995), as Valsiner (2017a) proposes for any psychological phenomenon. Creativity here is understood as something inherent to human action (Glăveanu, 2016a), both emerging from and informing it. Framed in this way, creativity is approached developmentally, that is, as a phenomenon changeable in time, constituent of and constituted by social interactions and communication.

Aiming to evaluate the factors that foster or hinder creativity in the workplace, Amabile and Grykiewicz (1989) developed the Work Environment Inventory. In spite of the rich literature on creativity in the workplace, enriched, for example, by Amabile (1996) and Amabile and Mueller (2008), the factors identified by the instrument above, like time pressure, run the risk of becoming dichotomized. As such, while one pole favors creativity, the opposite is seen as a constraint; meanwhile, the situation in which these factors operate is not taken into account. Another aspect to pay attention to is related to the risk of focusing mainly on how individual creativity, characterized by personal traits, can influence the workplace. The same can happen in applying the Jones Inventory of Barriers (Rickards & Jones, 1991) and the

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way it considers the role of past experiences, of limited options in problem solving, and of rigidity.

Another instrument developed for the same purpose and based on the literature about creativity in organizations, including interviews with employees of different Brazilian organizations (Bruno-Faria, 2010), emphasizes factors like: lack of time for elaboration, resistance to new ideas, and the necessity of approving a new idea by different hierarchical levels. The last factor in particular caught my attention first by making me wonder about the work environment in big organizations, second, by trying to relate it with the theoretical background and, third, by trying to apply this factor to the organization where I developed the research described below. I was thus particularly inspired by the issue of hierarchy and the main purpose of the instrument it derives from, developed as "a resource to identify obstacles to a more promising work environment and suggest changes to be implemented in order to promote a creative organization" (Alencar & Formiga Sobrinho, 2017, p. 170).

Adding to the inspiration for the present chapter, Chuang (2007) considered how the context of interaction and complementarity among individual, organizational and environmental factors affects innovation processes in the organization. This context can include positive or negative values, beliefs and behaviors which should be nurtured or discouraged, respectively, in order to make individual and organizations conscious of the power of their creative resources (Alencar & Formiga Sobrinho, 2017). However, it is important to go deeper by considering when and how a given action is or is not meaningful for creativity, taking into account the relations between individuals and between each individual and culture. Thus, in this chapter, creativity is approached in contexts of communication (Formiga Sobrinho & Glăveanu, 2017) and culture is seen as something progressively built, kept, changed or even destroyed by human actions (Valsiner, 2014a).

To find out how is it possible to be creative in the environment of an organization, the context this empirical research contributes to, it's important to present a theoretical approach which uses particular methods to understand this phenomenon. This should be done methodologically by considering the conditions for creative actions because, in spite of innovation being a priority for most organizations (Puccio & Cabra, 2010), the organizational culture usually puts constraints on creative actions (Lahlou & Beaudouin, 2016) and, on many occasions, it is up to the employees to find a way of dealing with these constraints. This chapter aims to contribute to our understanding of the role of context for creative action in a given workplace.

In order to reach this aim, the theoretical background considers the coercion, but also the flexibility of culture and its multiple facets, and the

dynamics of meaning making processes that are always open to novelties, to some degree, although not always able to materialize them. This chapter also approaches creativity as a phenomenon that goes beyond individual cognition or other individual traits, seen as separate from the environment (see Runco, 1994). Instead, I consider how cognitive styles and emotions are contextual, opening the door to considering how they were developed and how they change. Of course, personality traits and cognitive styles can give us important clues for understanding potentially creative actions as the ones presented here, but they cannot be considered the main source or determinant aspect of acting creatively (Glăveanu, 2016a). They become meaningless if considered apart from the contexts of interaction which can impact not only individuals and their goal oriented actions (Branco & Valsiner, 1997), but also work routines, projects or products through the communication between people.

The social and cultural approach adopted here makes it possible to understand creativity not only as an intra-individual phenomenon or simply constrained by factors of the organizational culture, but also as an outcome of the context of communication among individuals. Negatively or positively valued, the meaning of these factors cannot be taken for granted; that is, an organizational factor can be meant as constraint or facilitator to creativity (Formiga Sobrinho & Glăveanu, 2017; Stokes, 2007), depending on situational context. But why can't a given meaning be taken for granted and how can this duality be demonstrated?

That's what the following sections try to address. The first one focuses on the way concepts like culture and hierarchy become part of meaning making processes. The second one is concerned with the way in which communication is related to creativity in the context of the research, also considering the methods chosen for the investigation. The third one presents some of the findings. Finally, the last section offers a discussion and points to the next stages of the current research. In summary, the present chapter tries to demonstrate how an organizational culture is, is not and, most of all, how it can become favorable to creativity and, by this, tries to contribute to advancing the social study of creativity at the workplace.

From the Hierarchy of Meanings to the Meanings of Hierarchy

The notion of culture comes from the cultivation of grains in agriculture and, particularly since the sixteenth century, the period of the Renaissance, the term started to be used in Europe as associated with the outcomes of the

development of the human mind. This association followed its historical path and was reinforced in the eighteenth century, during the Enlightenment (Thompson, 1995). Culture, then, became progressively what it is today, a notion associated with the cultivation of ideas in human societies (Valsiner, 2017b). However, the use of this notion often denies its material basis and, by doing this, contradicts Vygotsky (1998), separating thinking from doing; it is also hiding the procedural character of culture and of its processes. The interconnected consequences of this historical trajectory bring about the necessity to treat culture as a developmental process, a movement that involves social interactions, interactions leading to a place and time that are unavoidably different than those experienced before.

When considering culture as action taking place in between the person and the world, its strength resides particularly in its relation to meaning making and its capacity to organize systems of communication (Valsiner, 2014a). This organization is based on coercive and hierarchical meaning structures (Machado, 2003), structures that ensure understanding and offer guidelines for individuals to relate with the environment and interpret future experiences (Valsiner, 2014b). In other words, hierarchical structures in language and social interactions can predict meaning making, particularly if or when they are related to remains of Western patriarchal, priesthood and military traditions of unquestioned authority (Goleman, Kaufman, & Ray, 1993) and information control. However, this coercion cannot be absolute, and the hierarchy of meanings is not unchangeable, as long as both are susceptible to communicational processes which – being more or less consciously goal oriented – can produce new meanings for a given sign or concept, due to the expected or unexpected changes that take place in the individual and in the environment as outcomes of their interaction. Thus, the place of a sign in the hierarchy of meanings is changeable and this this is the case even when "hierarchy" is the sign to be investigated.

Hierarchy comes from a remote process of organizing systems from biology to language, by establishing higher and lower levels or parts of a system. The action of identifying systems contributes to making them understandable, although this understanding would be improved by considering different parts or levels of the system as interacting with each other (Valsiner, 2017b). Curiously, the regulatory characteristic makes systems dualistic because they can be open and closed to changes, according to their communication with other systems. The same applies to the individual's actions in a cultural system (Valsiner, 2017a) and, thus, to an individual's particular performances in given systems like one organization, which is the focus of this research.

The meaning and place of hierarchy in the system is created in different environments according to the social interactions which impact its trajectory over time and characterize how hierarchy is performed and talked about. Resisting, contesting, confronting or negotiating are manners of dealing with the way a management hierarchy constrains creative actions in organizations, the processes through which we can change its meaning and, at least in some situations, turn it into a facilitator of creative actions. These processes of signification and re-signification become viable in communication, a particular interaction capable of balancing or even overcoming what Valsiner (2014b) calls the "constant asymmetric relations between the immediacy of the present-moment experience and the solid constancy of many features of the environment" (p. 23).

By doing this, communication brings together people in the development of a certain activity (Martino, 2001) and its levels, also determined by the purposes of the participants engaged in the communicational process, which can make this togetherness more or less favorable to creative actions (Formiga Sobrinho & Glăveanu, 2017). Those actions can be no more than original, a condition for creativity, but not a determinant of it since it is necessary to also reach what Runco (2008) calls effectiveness. Fluency and originality can characterize preschool children as they learn how to communicate, but effectiveness soon becomes important to make understandable the 'product' created, its functions and so on, and for it to be 'accepted' by some other individual, team, group or even society at large. All these involve the learning of communicational strategies from the mere use of language to rhetoric and persuasion (Bauer & Glăveanu, 2011) in parallel with the learning of 'conventions' which can work both to establish and to change social relations. Approached in this way, communication is what differentiates between creativity and mere originality. Thus, it works as a partial or temporary 'solution' to the tension in which creativity lies, between the novel and the adapted (Lubart, 2007), because it can contribute to positioning 'things' somewhere they can – or cannot – be considered creative, which also constitutes a hierarchy of sorts.

As constituents of the language system, meanings are organized hierarchically and maintained as such but, as aforementioned, the place of signs can be changed by the dynamic relations between individual and the environment (Valsiner, 2014a). Those dynamics are similar to the ones referred to by Chuang (2007), and this chapter tries to demonstrate how this dynamic applies to the sign hierarchy, in systems like an organization ruled by the hierarchization of meanings and by particular meanings of hierarchy. Based on the assumption that the emergence of change can be effortless if the climate for innovation is aligned with employees' attitudes towards innovation

(Goleman et al., 1993), it becomes possible to consider communication among individuals and between individuals and the organization as an essential activity for creativity, once creativity can be approached as a process that makes innovations possible (Bruno-Faria, 2003). Thus, once made possible by language and dependent on social interactions, communication can be a root for the study of organizational reality and creativity, as long as creativity is displayed in processes of interaction with others (Russ & Fiorelli, 2010) and it is related to meaningfulness, that is, with those actions which can produce something meaningful for someone (Beguetto, 2010).

Ultimately, meaningfulness is an outcome of social judgements (Csikszentmihalyi, 1996) and, because of this, also characterized by a kind of hierarchization. And when hierarchy is the sign to be considered, it's possible to hypothesize that it also can be changed by communication and that change can be characterized as the outcome of a creative action, depending on the environmental context in which communication takes place. In what concerns this research, hierarchization is also part of Brazilian culture, due, for example, to the way the country was colonized and to decades of authoritarian military Government finished in the 1980s, but whose impact can be felt up to this day. Thus, it strongly impacts the organizational culture of a public organization created in 1973, although at least part of its staff is trying to change this, in order to make employees satisfied with the work itself and also to change the image of the company for both the internal and external environment. The next section deals with this context of interaction in the internal environment of the organization.

A Possible Scenario for Creative Actions

Coming back to the question about the meaning of creativity in a given environment, here, that of a Brazilian public organization, it's important first to define organizations. I start from considering them as: "socio-technical entities combining people in an explicit structure with labour division to reach a goal" (Lahlou & Beaudouin, 2016, p. 478). This definition itself brings a constraining characteristic: once some way of 'organizing' is discovered, a new one can threaten what already 'works'. Thus, particularly when considering that some things can be more controlled in their micro-cultural context and that the 'institution' demands different kinds of investments, an organization – in particular a big one, which tends to be more bureaucratized and stifle innovation, different from small entrepreneurial or independent businesses (Goleman et al., 1993) – is a system characterized by resistance to

change, in spite of the need, disposition or even of a clear way to promote change. This means that any action towards change will constitute a potential fight against the ones who want to keep their position of power (Lubart, 2010) and the established rules. Through this, the trajectory of the change, more than its outcome, will reinforce the conception of creativity as a tension between what is novel and what is appropriate (Lubart, 2007).

Second, it's important to consider what is valued, for example, in different macro cultural contexts. Eastern cultures tend to give more importance to collaboration and group harmony in the workplace, while Western cultures tend to give more importance to individual goals (Goleman et al., 1993) and to ruptures (Lubart, 2010). These differences are also based on the influence of religious principles which, in Eastern traditions rely more on the novelty that comes from the existing and the established and, in Western ones, is more oriented towards the future (Albert & Runco, 2006). However, it's also important to emphasize that the values given to something cannot be generalized in terms of Eastern and Western culture and, even in micro contexts, small differences are susceptible to change, particularly because meanings are both triggers and outcomes of communication. This double role underpins the intersubjective basis of meanings (Gillespie, 2010) and makes communication a potential source for changing and renewing meanings, even if the communicational process begins by requiring some degree of similarity in order to generate understanding, as mentioned before.

Indeed, the communicational process can go beyond mutual understanding and allow changes and renewals, first based on the differences among individuals (Marcondes Filho, 2016; Valsiner, 2014b) and then in the way the individuals relate with each other and with factors from the organizational culture which influence social interactions. Depending on the kind of relation, meanings can be kept or changed, according to what is more valued in the workplace and also to the way in which both individual and organizational culture influence each other in the direction of old or new meanings.

Given the complexity involved in studying the impact of culture on creativity (Lubart, 2010), from macro to micro contexts, it's important first to consider the ambivalent role of culture as both constraining and enhancing creativity. The 'constraining role' is extremely relevant first and foremost for human development (Branco & Valsiner, 1997), since the outcomes of the interactions between individual and culture are not predictable and depend on the way the individual thinks, feels and acts, in order to reach his/her goals in a given time and place. Thus, goals and the way to achieve them can change and cultivate flexibility not only in individual actions, but also in the expectations of observers concerning the outcomes of these actions. This impacts the

methodology, which constrains the research (Valsiner, 2017a), and thus the researcher, the researched and their interaction. However, just as culture does, methodology has also its 'liberating role', once existing procedures and guidelines can lead to reach new findings and produce new knowledge (Branco & Valsiner, 1997).

Even in a micro context like the organizational one, it's important to consider the way each situational context can indicate if, why and how macro or micro environmental factors have a favorable or constraining influence over the actions and productions of the employees. Assuming that actions and their outcomes can or cannot be novel or produce novelties depending on the meaning of novelty and on the interactional way to achieve it (Lubart, 2010) in each organization, some procedures were applied here in order to keep the discussion based on examples. They were mostly inspired by the instrument developed by Bruno-Faria (2010), as aforementioned, and also by the work of Jaan Valsiner (2017a, pp. 44–45). The methodological steps followed in this Creative Culture Analysis are:

- Step 1: The nature of the person
  - Basic question: who is the individual and what is the creative potential of his/her speeches, actions and projects?
  - Methods:

    participating in weekly group meetings during which professional profiles and their projects were identified;

    individual interviews, beginning by asking information about the biography of each employee in general and the position and trajectory in the organization, trying to understand more than the individual/problem solver, the "process of unfolding of solutions and construction of novel ones" (Valsiner, 2017a, p. 39).
- Step 2: The nature of the environment
  - Basic question: how does the tension individual <> others/organization takes place according to the discourse of the employees?
  - Method: individual interviews focused on work routines, products and projects.
- Step 3: Practical action
  - Basic question: how does the tension individual <> others/organization takes place according to the researcher?
  - Method: thematic analysis.

- Step 4: Retrospect
  - Basic question: how do the perspectives of the researched and of the researcher meet?
  - Method: elaboration over similarities and contradictions, discussing how each one deals with organizational constraints and what solutions they find to develop their new projects.

In order to analyze the interviews, the following procedures were adopted:

- Reading and underlining the most frequent and/or relevant themes, then organizing the themes.
- This categorization made it possible to identify two main groups of organizational factors, the first constituted by factors mostly taken as constraints and the second by the factors mostly taken as facilitators:
  - Group 1: pressure; hierarchy; lack of money; and bureaucracy;
  - Group 2: collaboration; freedom; and openness/open dialogue.
- In order to go deeper in the analysis, hierarchy was chosen for this stage of the research. The notion of hierarchy is discussed at different moments in the interviews and is embedded also in other themes like bureaucracy and pressure, since it is a dominant characteristic of the organization.
- Each theme was related to actions mentioned by the interviewees and described using the following indicators (see also Table 23.1):
  - Work context – which could be resistance to hierarchy, for example.
  - Action – a brief narrative of something that happened, sometimes in the first person or in the third one.

Table 23.1 Cluster example for the theme hierarchy

	Interviewee 1
Work context	Openness from the hierarchy
Action	Trying to end the print version of journal B and keep just the online
Outcome	Chance to show the results of her research to support her arguments
Comment	She found an innovative way to approve ideas, once she learnt how to deal with some aspects of the organizational culture and change it some way at least to make her team focus its efforts on more effective products. To reach this goal, she is developing a research with different publics, including retired and people who work in rural territories, and also created choices for the ones who can't – or don't want to – use the digital version

  - Outcome – The result of the action particularly in what concerns some kind of change.
  - Comment – noting when the information in the other categories was questioned, tensions and contradictions were identified and some concepts or theoretical frames were suggested by the data.

- Lastly, a way to report the interactions among organizational culture and employee's creativity through communication practices was chosen.

Discussing the Movements of Hierarchy

The development of the Creative Culture Analysis methodology described in the last section led to the consideration that 'hierarchy' – just as 'freedom' and other signs – has its own ontogeny in macro and micro-cultural contexts, which can guide the way people deal with its meanings and these meanings are affected by human action and can shift places in the hierarchy. This is a dynamic that takes place in the researched organization, as well as in language, in psychological and biological systems. It is also specific for methodology itself, which, in the relation between researcher and data, for example, can allow or block certain methods and by this hierarchically establish their importance. However, as long as hierarchy is as circular or cyclical in methodology (Valsiner, 2017a) as elsewhere, in the next moment the same methods or meanings can – or maybe should – be questioned, adjusted or changed. This characterizes another subversion in the hierarchy of meanings or even a rupture in what some meanings of hierarchy are concerned, which can lead to creative re-signification.

The cluster of methods applied in this study made it possible to understand the interactions between individual and organizational culture, based on the fact that, over the years, the interviewees also developed their own culture in relation to the culture of the organization. Interviewee 1, for example, can be unique in her work style by applying her experience as a journalist to improve working with deadlines. According to her, "there is no demand from the organization or its employees", which means that, in spite of hierarchization, in what concerns the aspect of the product she is responsible for, establishing deadlines is her initiative. This constitutes something she was allowed to do by her superiors and, from a hierarchical position, it was due to her experience of fourteen years in the organization. It was also a way of trying to work positively with time pressure, in order to make her colleagues produce a deadline, the usual practice in journalism. By acting like this, she experienced and made

other employees experience different meanings of hierarchy in parallel with time pressure, a factor which can be a constraint in situations she exemplified when she said:

> It's hard to get all the collaborations… They [the employees invited to collaborate with the journal she edits] get no prize for this in their career paths. It's almost a volunteer work for them, who are overwhelmed [they have to answer to the external press, put news on the intranet, internet, mural, weekly media of their unit and corporate agency news]. I understand this.

By saying this, she exposes her difficulties to create the product and tries to put herself in the place of others. However, as long as the work must be done, she follows by saying:

> But I, as an editor, it comes a time when you think you lost your creativity. And now, what am I gonna create? Which is the hat, the red nose I have to keep? What I'm gonna do to call that people's attention to help me? I am very dependent on them.

As noticed, she worries about the creative process related to the journal. I asked if she doesn't try to present it to her colleagues as an opportunity to create, to which she answered: "Yes, and to present their work. Research showed the employees enjoy this media. So, who contributes knows that, someway, they're gonna have their job appreciated…". In spite of some difficulties and frustrations, inherent to different creative processes, she usually gets enough collaborations and succeeds in producing the journal as planned. Sometimes the topics for the next edition are already chosen and the collaborations of her colleagues is confirmed right before the end of the previous edition. Thus, the meaning and value of time pressure can be understood differently than what inventories previously made of it (Amabile & Grykiewicz, 1989; Rickards & Jones, 1991). It is not only a constraint for creativity, but it can foster it depending on the way it is managed by managers – in this case, the editor of a journal – and by ordinary employees. Of course, this management is influenced by different factors which can direct the meaning of the factor at different stages, either to the positive or negative side, if the evaluation is dichotomized in this manner.

The participant referred to above, in turn, has to deal with profits and losses for her uniqueness, a trait also 'shaped' by her trajectory in the organization and by the way she developed her own communication strategies. She mentions, for instance, a research conducted by her to show the importance of the journal for the organization and its appreciation by most of the employees. As

long as upper managers change, actions like these become necessary and should be repeated in order to remind people of the importance of the communication department. As an outcome of this research, she could implement changes like turning the journal bimonthly instead of quarterly and she is already planning the next step which is to publish the journal monthly. By doing this, she displays progressive learning about strategies of interacting with colleagues, managers and other environmental factors. And even when facing "crossed constraints" (Lahlou & Beaudouin, 2016, p. 483), that is, internal and external to herself, she is working on even bigger plans like ending the print version of the journal. The participant is paving the way to make this happen including by basing her communication with the upper management on research arguments and concrete findings. Of course, in this process she has to face frustrations and needs to ask for the support of the upper management to follow her ideas and projects, understand the organization and her colleagues' perceptions, and how any tensions between her and the organization can create ways of producing changes in the ways she and her colleagues think, feel and work.

As long as some meanings – like the ones for hierarchy and time pressure – can be changed, at least situationally, it's possible to envision that:

- communication can possibly change established meanings in time;
- organizations, at all times, need to change even when try to keep meanings the same; and
- creativity must be used for changing meanings from time to time.

Thus, according to the examples given, the development of communication strategies has the potential to produce changes in the organizational culture and at least renew meanings. Since creativity exists in social interactions (Russ & Fiorelli, 2010), actions can possibly be considered creative when they are meaningful for someone (Beguetto, 2010) and when their outcomes or the innovations come in the shape of making things possible, or making meanings viable in some contexts. In other words, creative products, behaviors and outcomes – and those mentioned here, in particular – will find their place according to the double role of the culture: establishing meaning by working with oppositions and also making them changeable (Gillespie, 2010). This ambivalence is both constraining and beneficial for creativity and human development more generally (Branco & Valsiner, 1997). Social creativity is situated in the tension between what is novel and what is adapted to some context (Lubart, 2007) and the hierarchies associated with creativity are thus variable.

Resisting – even to changes, as both individuals and organizations usually are –, contesting and confronting can be actions particularly associated with creative persons. However, when considered in organizational contexts, social interactions and the organizational culture will possibly influence these actions and sometimes transform them in the direction of either maintaining or changing meanings across the time. Thus, hierarchy can be the rule to be followed or to be subverted, but there are different ways of following or subverting it, mostly dependent on the use of communication to balance the difference between individuals (Marcondes Filho, 2016) and between individuals and their environment (Valsiner, 2014b).

Ending Remarks for Creative Culture Analysis

The examples above show how creativity can be situated in the tension between the novel and the appropriate, reflected in actions and communication in a given organization context which can demand innovation (Puccio & Cabra, 2010) and, at the same time, constrain creative actions (Lahlou & Beaudouin, 2016). Although the data are still not enough to consider if the tension involved in challenging situations motivates creative efforts from a cognitive standpoint (Runco, 1994), the goal oriented actions (Branco & Valsiner, 1997) exemplified here show how Interviewee 1, for example, makes hierarchy change from its constraining to its facilitating role and this increases her chances of proposing and implementing changes in the organization. This confirms the hypothesis about the potential of communication to produce changes which can constitute, at least temporary, examples of creativity, depending on context; it also attests the importance of the tension between individual and culture to make creativity possible (Glăveanu, 2016b), as well as a broader understanding of the role of constraints towards creative actions (Stokes, 2005). The same applies to concepts like 'freedom' in contexts of social interactions and communication where they meet limits and can be better understood in a dialectical relation with their opposites. That is to say that here creativity is considered in relation to and conditioned by communication and the analysis of the interviews points to the ways in which each participant contributes to progressively changing, even if at a micro level, the organizational culture by generating and developing new ideas and, by this, inspiring colleagues towards building an environment more favorable to creative work.

In what concerns the next methodological step, understanding the organizational culture is facilitated by the fact that Interviewee 3, for instance,

mentioned that: "Partnership among public and private organizations are increasing and tend to go even further now that we are thinking about the organization's technological unit". This was mentioned in the context of talking about the importance of collaboration and of partnerships for innovation, an important issue for a public organization focused on science and technology and – at least supposedly – of many private ones. Both types of organization reflect different historic contexts and have different ways of setting constraints to creative actions (Lahlou & Beaudouin, 2016). Thus, the employees face both different and similar challenges when it comes to overcoming the coercive power of the organizational culture and trying to explore its openness for change.

Both can be understood by using a theoretical frame of creativity that considers it a phenomenon embedded within cultural context and deeply connected to the communication between person and context, within a hierarchical organization. This perspective reveals the complexity of hierarchy both to the employees and the researcher and, although the number of interviewees is still low, it can constitute a starting point for a generalization that doesn't rely exclusively on the number of participants in a research, but on the representativeness – an unavoidable hierarchical categorization – of the experience of the researched individuals (Valsiner, 2014b). This can be exemplified not as some uniqueness that is generalizable (Valsiner, 2017a) but, for example, what might be generalizable are insights into how the uniqueness of Interviewee 1 in what concerns the way she deals with tension and disturbance (Runco, 1994) emerged or oriented some of her actions in the given organizational environment.

In what concerns the limitations of the study, it's important to consider the fact that Interviewees 1 and 3 are both professionals of communication and researchers, just like the interviewer, and thus could have added or subtracted some details because of this. Moreover, apart from the fact that "any unique cultural phenomenon carries with it general principles of semiotic mediation that makes it possible" (Valsiner, 2017a, p. 79), the methodology proposed can be 'tested' on further researches with other selected employees (Valsiner, 2017b), in order to confirm, disconfirm and enrich its findings.

Maybe in a further study the influence of the culture of the researched organization on the creativity of the employees can be compared to and contrasted with the influence of the culture of other organizations from the public or private domain over the personal culture of employees. This would possibly enhance our understanding of creativity in different organizational cultures, as well as reinforce a basic principle according to which a culture can be understood in relation with another (Geertz, 1973) and reveal its

importance for creativity (Lubart, 2010), which is a phenomenon studied here using a cultural approach (Glăveanu, 2010). In this way my hope is that the current chapter can contribute to advances the social study of creativity, the main topic of this book.

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Part III

Reflections on Social Research into Creativity

24

Evaluation of Creativity Is Always Local

Robert J. Sternberg

You likely are familiar with the old conundrum, "If a tree fell in the forest and there were no one present to hear it, would it make a sound?" To some readers, the conundrum is about at the level of "How many angels can dance on the head of a pin?"—a metaphysical problem that might be worth the time of philosophers to discuss but that does not rate the time of anyone else. It may be an insoluble problem (Davidson & Sternberg, 2003). But I would argue that this conundrum is highly relevant to understanding how creativity and other developed abilities can be evaluated.

Two definitions of "sound" in dictionary.com are

> 1. the sensation produced by stimulation of the organs of hearing by vibrations transmitted through the air or other medium.
> 2. mechanical vibrations transmitted through an elastic medium, traveling in air at a speed of approximately 1087 feet (331 meters) per second at sea level.

These two definitions lead to different answers to the tree-in-the-forest conundrum. According to the first definition, the answer to the "tree in the forest" question is "no." According to the second definition, the answer to the "tree in the forest" question is "yes." In the first case, there was no stimulation

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of organs of hearing, and hence there was no sound; in the second case, there were mechanical vibrations so there was sound.

But creativity, unlike sound, does not have a physical property corresponding to mechanical vibrations transmitted through an elastic medium. As Csikszentmihalyi (2013) pointed out, creativity exists in the interaction of a person or persons, a domain, and a field. Creativity ultimately is judged by consensual validation (Amabile, 1996).

Having a field of people, presumably experts, to make judgments might give some people, including perhaps Csikszentmihalyi and Amabile, some comfort. But the situation may be worse than it appears to be. Consider again the tree in the forest.

Suppose the tree falls in the forest. And suppose that it happened that humans had evolved into two separate groups, one group with hearing organs that can pick up the range of Herz that encompasses the fall of a tree and another group that can pick up a range of sounds only in a much higher (or lower) set of frequencies. At the time the tree fell in the forest, only the group that could not pick up the Herz range of the tree happened to be present. The result is that those humans failed to hear the tree fall. As far as that group knows, there was no sound. Keep in mind that we cannot hear many different sounds because they fall outside our audible range (they are too low or high in frequency) and, similarly, we can see light in only a small portion of the electromagnetic range. Most of the electromagnetic range is invisible to us. The point is that different groups may evaluate creativity differently, with each group believing that its evaluations are valid.

Similarly, much of what counts as creative may fall outside our range of conception. Creativity can be evaluated only locally—in particular contexts—simply because much of what is creative in the universe or even just our world is beyond our ken. We can understand or appreciate it no better than we can see electromagnetic radiation outside the range of visible light or hear sounds outside the frequencies to which our ears are attuned. But we can "see" or "hear" those inaccessible frequencies with help (from machines). In the case of creativity, thankfully, we also can recognize as creative ideas that fall outside our range of understanding and appreciation—the question is whether we wish to.

Evaluating Creativity

If you walk into, say, the New York Museum of Modern Art, you will see modern artworks that, to some visitors, seem like the work of a child or a deranged would-be artist, and that appear to others as works of world-class

artists. In the domain of politics, if you ask people on the street whether Donald Trump has proved to be a creative president, half might answer with an enthusiastic "yes" and another half with a look of disbelief that anyone even would ask the question. Even in science, when Trofim Lysenko suggested that acquired traits could be inherited, part of the world viewed him as an extremely creative scientist and another part of the world viewed him as a quack.

The relativity of creativity to audience extends over time as well as geography. Essentially, people "create creativity," or at least what they mean by creativity (Glaveanu, 2011). As Stein (1953) pointed out, a "creative work is a novel work that is accepted as tenable or useful or satisfying by a group in some point in time" (p. 311). What is creative, therefore, is relative to the particular group. Most people would regard the work of Monet and Renoir to be highly creative, but the Impressionist work of street artists on Newbury Street in Boston (and similar streets in New York and Paris) would be viewed as much less creative, in part because Impressionism is no longer a new idea, so that someone who works within that mode would have been viewed as highly creative at one time, but not so much today. And when they first produced their work, Monet and Renoir were met with rejection by those who preferred the more "realistic" renditions of earlier French and other European artists.

In a sense, *the evaluation of creativity is always local*: It is relative to some set of norms. This local character of creativity poses a problem for tests of creativity, such as that of Torrance (1974), because such tests assume that there is some kind of universality to creativity—that it is possible to score the tests and then provide scores that will apply in any time or place. But whether work is creative in fact is not a product of some kind of universal evaluation, but rather will depend on the context in which creativity is evaluated. What is viewed as creative in one society may be viewed as uncreative in another society and as worthy or prison or a death sentence in yet another society. If you do not believe this, go to China, Turkey, or any of a number of other countries and try generating some creative blogs regarding what you see as flaws in the government. Then circulate your blog widely.

One might think that the greatest thinkers of all time defy local notions of creativity. And perhaps the localities that judge them to be creative are much more widely distributed than the localities that judge you and me to be creative! But so many contributions that are thought to be universally creative come to be viewed differently later on, just as many contributions originally judged uncreative later are judged to be creative. According to Google Scholar, Sigmund Freud has been cited in the scholarly literature over 500,000 times,

putting him in a class by himself. In 2016 alone, he was cited over 27,000 times, an amazing record. Yet, more and more developmental-psychology texts are deemphasizing or actually eliminating coverage of his work. Relatively few new psychotherapists are training to be "Freudians," at least in the United States. The reason is that, today, the work is seen as dated—as reflecting a view of sexuality that, however well it fit into Victorian times, no longer fits into modern times. On this view, the work was very creative at the time. But however novel it once may have been, it no longer is seen as compelling by most psychological scientists. Similarly, Jean Piaget, cited over 300,000 times (over 15,000 times just in 2016), is today viewed largely as a stalking horse for cognitive theories pointing out the flaws of the work. One is hard-pressed to find any Piagetians in any top departments of psychology, at least in the United States.

There are others, like Charles Darwin, who would seem to transcend local norms, except perhaps for the 68% of Americans who do not believe in evolution by natural processes. One is more inclined perhaps to believe the 87% of American scientists who do believe in evolution (https://en.wikipedia.org/wiki/Level_of_support_for_evolution#United_States). One then ends up wondering who decides who is creative? Scientists? Artists? Laypeople? And the scientists who believe in one thing one day (e.g., the geocentric theory of the relation of Earth to the universe, the causal role of phlogiston in causing fire) may believe something else later on. Perhaps there will be people like Darwin and Einstein and Plato and Aristotle who transcend local norms. At the same time, how many students today have read the works of any of these great minds? How many students of the future will have anything but the vaguest idea of how the philosophy of Plato differed from that of Aristotle, or of any Shakespearian plays beyond, perhaps, *Hamlet* (if that)? Courses on Western Civilization are rapidly disappearing from university curricula, at least in the United States, in favor of what is believed to represents greater alleged "diversity" in the curriculum.

A composer like Mozart or Beethoven may seem to transcend local norms, until we realize that in some Muslim societies, playing of music is forbidden, or at least, frowned upon. People in those societies may view Mozart as sacrilegious, as did some Westerners when they first heard the music of Schoenberg or even of Stravinsky.

It is tempting to say that designated experts should judge what is creative. But whose experts? There is no more uniformity in deciding on who is expert than there is on deciding on what is creative. For example, in 2017, when this article is being written, some people believe that Donald Trump is appointing "anti-experts" to cabinet positions, such as a head of the Environmental

Protection Agency who appears to have devoted his career to undermining environmental protection and the agency for which he has now taken charge. Who decides who are the experts, and who, the novices or even anti-experts? Elites in the United States thought they were the judges, until they weren't. There were probably many experts in the Roman Empire, until the Roman Empire was overthrown and there was no appreciation of or use for the experts. In the Soviet Union, the experts on Marxist ideology and economics became non-experts in a matter of the blink of an eye. What was creative one day was dated and viewed as worthless the next.

My colleagues have devised various modern assessments of creativity (e.g., Niu & Sternberg, 2002; Sternberg, 1993, 2010; Sternberg & Davidson, 1982, 1983; Sternberg & Lubart, 1995), as have others (e.g., Amabile, 1996; Finke, Ward, & Smith, 1992; Kaufman, 2012; McKay, Karwowski, & Kaufman, 2017). Although these assessments may be effective in some degree, they are effective only within local contexts. So yes, they are measures of creativity, but no, they are not measures of some kind of universal set of traits that exist inside the brain, or anywhere else. People in some cultures will not even understand what they are expected to do when confronted with the items (see Sternberg, 2004). And evaluators may have different ideas about what constitute creative responses.

My colleague Todd Lubart and I (Lubart & Sternberg, 1995) discovered first-hand just how problematical it is to evaluate creativity. Our evaluators were teachers, who presumably would be in some reasonable position to assess creativity. In one of the studies we reported, we assessed whether people who were more willing to take risks were more likely to produce creative products, as our theory said they should. We found the expected positive relationship for art products but not for essays. Our initial impression of the findings was that risk-taking is associated with risk-taking in the nonverbal domain but not the verbal domain.

That interpretation was incorrect. When we looked at the original data, we discovered that, for the verbal products, some teachers rated down creative products containing arguments with whose conclusions they disagreed. In other words, their view of creativity was one of products that are original, surprising, and compelling, so long as they could accept the arguments.

Our new interpretation was that the measurement of creativity can be only as good as the judges. Is it not sad that some teachers cannot accept arguments that are contrary to their own belief systems? What this suggested to us is that measurements of creativity can be no better than their raters, and in this case, some of our raters either were inadequately trained or were inadequately prepared to do the rating task.

This interpretation was also in a sense naïve—it too was wrong. According to my triangular theory of creativity (Sternberg, 2018), creativity involves three kinds of defiance—defiance of the crowd, defiance of oneself, and defiance of the Zeitgeist. Defiance of the crowd means that one is willing to take on what others believe (and know they believe). Perhaps one could say that our subjects who were marked down for taking controversial positions defied the crowd. They may well have done so. Defiance of oneself means that one does not get stuck in a set of beliefs just because one has held those beliefs in the past, perhaps for a long time. So perhaps some of our raters failed because they were unable to let go of old beliefs. Defiance of the Zeitgeist refers to defiance of the often unconscious beliefs and attitudes with which we approach life. Because we are unaware of these beliefs and attitudes, we are in a poor position to defy them. We are not even aware of what it is we should be defying. What is viewed as creative within the present Zeitgeist may be viewed as trivial in some future Zeitgeist, and vice versa. How creative will future generations of psychologists view research that shows that, when people perform a particular cognitive task, a certain area of the brain lights up? What gets you a job at Harvard or Yale today may be the subject of essays in the future as to how misguided the psychology of the past was, much as we view the psychology of Freud and Piaget as largely misguided today.

When some of the teachers downgraded some of the students' essays for disagreeing with them, they may have been unaware that they were doing so. The beliefs that were being defied may have been part of their Zeitgeist, beliefs they are hardly aware they have. But at the same time, how many times have we all rejected ideas that were outside our own Zeitgeist? The first time I heard about the idea of emotional intelligence, for example, my attitude was extremely skeptical. I had been studying intelligence for some years and this idea just went outside my Zeitgeist. Eventually, I came around to accepting the idea. But how different was I from those teachers who downgraded the essays with which they disagreed? How different is any of us?

The teachers' behavior points out that evaluating creativity may itself take creativity. If evaluators are not themselves creative, at least to some extent, it may be hard for them to evaluate creativity. If they see a product that is novel in some way—that defies conventional thinking—their first thought may be that the product is novel but low in quality and thus not creative. Who among us is not, at times, susceptible to the same kind of thinking? In judging creativity, therefore, we need not only be evaluative in our thinking, but also creatively evaluative.

How, then, can we evaluate creativity if creativity can be evaluated only locally? We can evaluate it just fine if we agree that our evaluations of what

usually is viewed as constituting creativity—novel, surprising, and compelling ideas or products—represent local norms. This, of course, is disappointing to those who believe in creativity as a trait.

One might think there are other attributes of higher mental function that escape local evaluation or that can be evaluated more objectively. Perhaps regrettably, the same principle of locality applies to the evaluation of wisdom and intelligence too (Sternberg, 1997). Those also are largely local. Thus we need to be cautious in assuming that there is some kind of universal measure of intelligence (such as the Wechsler or Stanford-Binet or Raven tests) or of wisdom. All of these higher mental constructs are in part culturally and socially constructed.

Evaluating Wisdom

Wisdom is truly important to the world (Sternberg & Glueck, in press; Sternberg & Jordan, 2005). The world today is quite a mess, and seems to be in the process of becoming messier. Poverty rates are staggering, income inequality is at record levels, hunger is rampant, violence can be found on every continent, and appears to be increasing since the last presidential election with the election of a president who appears to have encouraged interpersonal violence at his rallies. Certainly the world needs wisdom as never before, which is the use of one's knowledge and abilities toward a common good (Sternberg, 2013).

There is a rub, however, and that is the notion of a common good. In the balance theory of wisdom (Sternberg, 1998), the common good is a balance of courses of action that balance one's own needs with those of others and of higher order entities, such as communities, nations, and the world. But it has become clear that people have very different ideas of what constitutes a common good, and even who should be included in the "common good." Terrorists obviously have a different idea of the common good than that of pacifists.

One could, of course, dismiss the thinking of terrorists as deluded. But how about the large percentage of people in the United States supporting policies that happily harm themselves to the benefit of the ultra-rich? Perhaps they are fools, but do we write off their views, merely because we believe them to be fools, at the same time that they believe us to be fools? How can one ever find any consensus as to what constitutes a common good? Even if people united to promote a single common good, what organisms would be hurt by the human common good? Already countless species have been eradicated by

humans living on this planet, including some of them who might believe that they are promoting a common good.

We have devised tests of wisdom (Sternberg, 2010), as we have devised tests of creativity. But the tests of wisdom are scored in terms of the views and attitudes of local groups of scorers. Find scorers at a different time and place, and the scores might be and, indeed, will be different.

It would seem that there must be some ultimate arbiter in evaluation of wisdom: Wouldn't anyone in his or her right mind view, say, Martin Luther King or Mother Teresa as wise? But both of these individuals had serious issues in their lives. King, for example, was unfaithful in his marriage and Mother Teresa had serious doubts about her faith. Nelson Mandela was certainly a wise leader, but in his early life was a proponent of violence. Can anyone (other than Jesus) point to him or herself as an unimpeachable model of wisdom or any other virtue?

Evaluating Intelligence

Intelligence, might seem, on its face, to be different from creativity and wisdom. After all, there are seemingly objective measures of intelligence, ones that do not need the kinds of raters one inevitably needs for measures of creativity or wisdom.

The case of intelligence, however, assumes that what is "intelligent" is invariable. It isn't.

In a study conducted in Usenge, Kenya, near the city of Kisumu, my colleagues and I were interested in the ability of school-age children to adapt successfully to their indigenous environment. We created a test of practical intelligence that measured adaptation to the environment (Sternberg et al., 2001; see also Sternberg & Hedlund [2002] for further discussion of practical intelligence and Sternberg & Smith [1985] for further discussion of social intelligence). Our test of practical intelligence assessed children's informal (or tacit) knowledge of natural herbal medicines that the villagers believe can be used to combat various kinds of infections. Many and probably most of the villagers believe in the efficacy of these natural herbal medicines. Indeed, children in the villages use their knowledge of these medicines, on average, once a week in medicating themselves and/or others. From our point of view, then, tests of what these medicines are and of how to use the medicines constitute effective assessments of one facet of practical intelligence as conceptualized by the villagers for their environmental contexts. Typical middle-class Westerners

might find it an impossible challenge to thrive or even to survive in these kinds of contexts.

We assessed the Kenyan children's skill in (a) identifying the medicines, (b) stating where they come from, (c) recognizing what they are used for, and (d) knowing what appropriate doses are. Based on work we previously had done elsewhere, we predicted that scores on this test of practical intelligence would show no correlation with scores on conventional tests of intelligence. To test this hypothesis, we further administered to the 85 children in our study the Raven Coloured Progressive Matrices Test. This test is a measure of fluid or abstract-reasoning-based abilities. We also administered the Mill Hill Vocabulary Scale, a measure of crystallized or more formal-knowledge-based abilities. Furthermore, we administered to the children a comparable test of vocabulary in their native Dholuo language. The Dholuo language typically is spoken in the home, whereas English is spoken in the schools.

In fact, we found no correlation between scores on the test of indigenous tacit knowledge and scores on the fluid-ability tests. But, to our astonishment, we discovered statistically significant *negative* correlations of the tacit-knowledge tests with the tests of crystallized abilities. Put another way, the higher the children's scores for the test of tacit knowledge, the lower their scores, on average, for the tests of crystallized abilities. This unexpected result could be interpreted in a variety of ways, but based on the ethnographic observations of the anthropologists on the team, Geissler and Prince, a likely scenario takes into account the experiences and expectations of families for their children.

Most children in the village drop out of school before they graduate, for financial or other reasons. Many families in the village do not particularly value or really see any use for formal Western schooling. Because the children of most families expect to spend their lives farming or engaged in other occupations that utilize little or none of Western schooling, there is not much incentive to stick with such schooling. These families stress the teaching of their children the indigenous informal knowledge that they believe will lead to successful adaptation in the environments in which the children ultimately will live. Children who pass their time learning and applying the indigenous practical knowledge of the community generally have little reason to invest themselves heavily in doing well in school; in contrast, children who excel in school have less incentive to invest themselves as heavily in the learning of indigenous knowledge—hence the negative correlations.

Our work in rural Kenya suggests that if scholars identify a general factor of human intelligence, this factor may be more informative about how

abilities interact with patterns of schooling and particularly Western patterns of schooling than about some innate structure of human abilities. In Western schooling, from an early age, children usually study a variety of subject matters and thus develop knowledge and skills in a variety of domains. This Western kind of schooling prepares children to take tests of intelligence and related skills. Often, tests of intelligence and related skills measure the particular skills that children were expected to have acquired some years before they took the intelligence test. But as Rogoff (1990) and others have observed, this Western pattern of schooling is far from universal and has not even been common for most of the history of humanity. Throughout history and even today, schooling in much of the world, especially for boys, is in the form of apprenticeships in which children learn a trade or a craft from an early age. The children learn what they will need to know to succeed in a trade or craft, but not a whole lot more. They do not learn the abstract-reasoning skills that are so important for success on conventional intelligence tests. Thus it is less likely that one would observe a clear general factor in their intelligence-test scores. Similarly, in work with Yup'ik Eskimos (Grigorenko et al., 2004), my collaborators and I discovered that low achievers in school can have high practical adaptive skills in their home environments.

If some of us were born into a hunting and gathering culture, we might find that our high IQs aren't worth a plugged nickel. We might find the same in rural Alaska when we try to find our way from one village to another in the frozen tundra during the winter, something Eskimo children with not particularly high IQs can do, but that would baffle their teachers. Indeed, our high IQs might not even get us very far in a gang-infested inner-city neighborhood that we, for one reason or another, end up traversing during the dark of a pitch-black night.

IQ-based skills may be adaptive in the kind of knowledge- and reasoning-based culture that has dominated "civilization" for a millisecond of millennial time, but that perhaps would have been less relevant at many other points of the Earth's existence. There may be times when, confronted with a survival-of-the-fittest exercise, our IQs would not be nearly enough. So the objectivity of intelligence tests is, in one sense real and in another sense illusory. It is real in the sense that the items have objectively correct answers within a particular system of knowledge. It is false if one goes beyond a local context to state that answers to lots of these items prove that we would be intelligent at any time or place. In the end, we are in the same place as we are with tests of creativity and wisdom.

Conclusion

Creativity, wisdom, and intelligence are all important constructs in our lives, but how they play out and are judged is local with respect to time and place. Certain processes of adaptation may be the same across may environments (Sternberg, 2004), but how these processes play out in real-world contexts can differ from one time and place to another. And who will be skilled, or at least judged to be skilled, at executing those processes may be quite different from one time and place to another. There is nothing wrong with measuring creativity, or wisdom or intelligence, but we need to remember that we are evaluating them in a local context. To the extent that we believe we are evaluating some kind of universal constructs, perhaps we need ourselves to wonder whether any creativity, wisdom, and intelligence we have would quickly evaporate outside the local context that allows us to hold such a cherished but unsupported belief.

The point of view expressed in this essay may seem pessimistic or even cynical. I do not see it in that way. If value systems are local, that does not make the value systems less valuable. Rather, we need to recognize that others may have different value systems and metaphors of mind, and we will benefit from and think critically about understanding those different value systems (Sternberg, 1985a, 1985b, 1986). As I see it, that is much of what wisdom is (Sternberg, 1998), including when wisdom is applied to understanding, creativity, intelligence, and wisdom (Sternberg, 2003). Some value systems, such as those of Judaism, Christianity, Islam, and Buddhism, have had tremendous range. Some products have been judged as creative, wise, or intelligent, across wide spans of space and time. But none has reached universal consensus. If we are open to different value systems, we may expand our notions of what is creative (or wise or intelligent). But we still will need to recognize that in a different somewhere or "somewhen," what we most value as creative, wise, or intelligent, may be seen as of much less value, or even as uncreative, unwise, or just plain stupid. There may be some universal system of valuing, but if there is, we have not found it yet, and perhaps never will.

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25

Creating Social Creativity: Integrative Transdisciplinarity and the Epistemology of Complexity

Alfonso Montuori

"Would you tell me, please, which way I ought to go from here?"
"That depends a good deal on where you want to get to."
Alice and the Cheshire Cat in Alice's Adventures in Wonderland
(Carroll, 2006, p. 49)

Introduction

After 30 years of research on social creativity, the topic continues to fascinate me in always surprising ways. This is not just because of the excellent company of colleagues who share my interest (although not necessarily my views, which makes things livelier), but also because, Alice-like, the more I get into "social creativity," the more it seems like a magic portal to a looking-glass world where everything is connected to everything else (Briggs & Peat, 1989; Carroll, 1981; Christakis & Fowler, 2009). More than the specifics of social creativity, or what I originally thought the specifics were, like creative collaborations, environments that support creativity, debunking the mythology of the lone genius, and so on (Montuori, 1989; Montuori & Purser, 1995), the exploration of social creativity opened doors for me that led to a reflection on knowledge, method, and complexity: in other words, a fundamentally epistemological reflection. I became interested in how we create our understanding

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of creativity, and how that understanding (both academic and in everyday life) in turn "creates" us, in a mutually causal process (Montuori & Donnelly, 2016).

I began my exploration of "social" creativity for two reasons, one musical and one political. The musical reason was that I grew up, listening to and playing in musical groups. In graduate school in the early 1980s I found to my surprise that there was hardly any research on creative groups or creative relationships. There was certainly no discussion of what perhaps excited me most, and the kind of music I most enjoyed playing, the collective improvisation found in jazz, and in more eclectic electric bands like *Weather Report* and *King Crimson*. Not surprisingly perhaps, there was also very little research on improvisation.

My puzzlement at what was and what was not researched, how these choices were made (mostly without the process being addressed), and the apparent blind spots, in turn led me to an exploration of the way we construct our understanding of *any* phenomenon, not just creativity. It led me to study distinctions and choices, the role of disciplinarity, of paradigms, how national cultures play a part in shaping our approach to and interpretation of a topic, and how the "construction" of our understanding is in fact itself the result of a creative process (Montuori, 2005a, 2013b, 2017; Montuori & Donnelly, 2016; Montuori & Purser, 1995, 1999a). It eventually led to the development of something I call Integrative Transdisciplinarity, inspired by the work of "transversal" thinkers Edgar Morin and Gregory Bateson (Bateson, 1972, 1991, 2002; Morin, 2008a, b), in an effort to address both the disciplinary fragmentation and the gaps created by that fragmentation. Central to Integrative Transdisciplinarity is the role of complexity, of what is woven together, which means there is a focus on context and connection, not simplification and abstraction from context.

First Steps into Creativity and Authoritarianism

The second reason for my interest in social creativity was political, the result of seeing the racism, prejudice, and stereotyping in Europe during the turbulent 70s and early 80s. I first came across creativity research while doing research on the authoritarian personality, attempting to understand the motivations for prejudice and racism, and the desire to dominate and control others. The classic study of authoritarianism (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950) is now once again the subject of discussion after

being rather unfairly dismissed and spending some years in obscurity. It presented a compelling portrait of people who were, among other unpleasant characteristics, closed-minded, prejudiced, and dualistic. This psychological profile made me want to know why some people were *not* closed-minded, *not* prejudiced, *not* dualistic, *not* conformist, *not* simplistic thinkers. There seemed to be very little research on this topic, and as far as I could see it certainly didn't constitute a systematic research agenda. Yet I found these open-minded people described in Frank Barron's research on creative individuals, whose characteristics turned out to be the exact opposite of authoritarians. And indeed, in one of her chapters in the classic volume she co-authored, *The Authoritarian Personality*, Else Frenkel-Brunswik (Adorno et al., 1950) discussed the difference between prejudiced and non-prejudiced individuals (high scorers and low scorers respectively), writing that.

> (I)t is perhaps mainly the readiness to include, accept, and even love differences and diversities, as contrasted with the need to set off clear demarcation lines and to ascertain superiorities and inferiorities, which remains as the most basic distinguishing criterion of the two opposite patterns. (pp. 485–486)

Most intriguing was her finding of the

> generally more creative and imaginative approach of the low scorer both in the cognitive and in the emotional sphere, as compared with a more constricted, conventional, and stereotypical approach in the high scorer. (p. 475)

Many of the basic insights of *The Authoritarian Personality* have been supported, corrected, developed, and expanded by more recent research (Altemeyer, 1981; Brown, 2004; Jost & Sidanius, 2004; Martin, 2001; Roiser & Willig, 2002; Stone, Lederer, & Christie, 1993). Nevertheless, the connection between authoritarianism and creativity has not been pursued with anything like the alacrity I believe it deserves. If creative people tend not to be prejudiced, authoritarian, and racist, then this is surely something worth exploring (Montuori, 1989, 2005b, In Press). Frank Barron called his first major book *Creativity and Psychological Health* (Barron, 1963) and its revised edition *Creativity and Personal Freedom* (Barron, 1968), and Abraham Maslow, who had also researched authoritarianism (Maslow, 1943), held that the healthy, self-actualizing person and the creative person were in many ways one and the same (Maslow, 1993). The connections between creativity, psychological health, authoritarianism and prejudice had been hinted at, sometimes rather forcefully, but they had not been fully articulated, and definitely not

systematically explored. It's also interesting to note that some of the "traits" of the creative personality are in fact drawn from social psychological studies of conformity and authoritarianism. The Asch conformity experiments, for instance, also identified a minority who were *not* conformists and showed Independence of Judgment, and the same applies to Tolerance of Ambiguity (Asch, 1956; Barron, 1953b; Block & Block, 1951; Frenkel-Brunswik, 1949; Lauriola, Foschi, & Marchegiani, 2015; Lauriola, Foschi, Mosca, & Weller, 2016). This should give pause for reflection about the way "individual" and "social" are intertwined.

The exposure to authoritarianism research made me approach creativity with a different perspective. Creativity research and the characteristics of creative persons offered an insight into a way of being in the world that seemed to be more open-minded, more cosmopolitan, more complex, more likely to find creative approaches to differences, indeed a way of being that thrived on difference. It was also a more *complex* way of being in the world, one that was perhaps not always even-keeled, not always stable and entirely "sensible," which made it the subject of some diffidence by psychologists who saw psychological health as psychic equilibrium (Barron, 1953a, 1995). But precisely because of that ability to go to extremes of feeling and ideation and then bring it all back thanks to their ego-strength (Barron, 1968, 1969), creative people seemed to have a richer experience of being human, and less prone to intrapsychic or political repression (Barron, 1968).

Beyond any achievement in the arts and sciences, creativity research offered the outline of *a way of being* that seems more suited for a complex, uncertain, pluralistic world. In other words, creativity also involved a different way of *relating* to the world. Since creative individuals seemed to engage in a regular process of personal destabilization, at times exploring psychic extremes, and engaging in what Dabrowski called "positive disintegration" (Dabrowski, 1964, 1967), my questions were not just about how creative individuals relate to society, but about how society relates to creative individuals, or to the potential for creativity in people in general. It was very clear, from research as well as from personal experience, that most societies do not seem to support creativity, and that most schools and organizations actively suppress it. Even today, when creativity is viewed as central for economic growth, the engine of "disruptive innovation," a "key competence" for leaders and managers, there's research showing that while creativity is desired, it's also rejected more often than not (Mueller, Melwani, & Goncalo, 2012).

Strategies of Simplicity and Complexity

Vlad Glăveanu has been central in promoting the importance of social creativity. He has made several important arguments for studying the underlying philosophical assumptions of creativity research, the articulation of phenomena involving more explicitly relational creativity, and the contribution of cultural psychology and more broadly of socio-cultural perspectives on creativity (Glăveanu, 2010, 2014a, 2016, 2017a, b). He has also launched a fruitful challenge to creativity researchers by asking if there is currently a crisis in the field (Glăveanu, 2014b). The answer to that question, it seems, depends on who you ask, and what they see as the overarching task of creativity research now. One approach is to become more focused, more specialized, and attempt to eliminate what are perceived to be exogenous, unnecessary factors. This is the approach proposed by Runco and Weisberg (Runco, 2015; Weisberg, 2015). Weisberg has proposed a new definition of creativity that focuses only on *novelty* and *intention*, eliminating the traditional second part of the standard definition of creativity, original *and valuable*, because it involves social judgment. Weisberg argues that one reason for this change would be "for psychologists to regain control over the study of creativity" (p. 119), suggesting at least that psychology has, in fact, lost control and is no longer what I would call the *Dominant Disciplinary Discourse* of creativity (Montuori, 2010), the discipline in which most of the research on creativity is conducted and which is most associated with creativity. It is certainly the case that psychology is no longer the only discipline where extensive creativity research is conducted.

Runco (2015) agrees with Weisberg that the definition of creativity needs to be changed from original and *valuable* (or a term to that effect) to original and *intentional*, so as not to bring in what he describes as the subjective social elements. Runco believes it is important to identify what is *necessary* for creativity, and distinguish it from what is *unnecessary*, or "mere influences" (epiphenomenal). These unnecessary mere influences, he states,

> include personality, attitude, culture, development, and motivation. The theory of *parsimonious creativity* focuses on an actual mechanism and extricates correlates (i.e., mere influences and possible, but not guaranteed results). Also, it is nicely scientific in its emphasis on *parsimony*. This is in direct contrast to a social definition—and any definition that includes unnecessary influences or unnecessary effects. (pp. 25–26)

Runco and Weisberg have to be commended for making their approach, and their assumptions, so explicit. This kind of theoretical and methodological

excavation and explication is increasingly necessary as we encounter a plurality of approaches to creativity research originating in a variety of disciplines. Weisberg's and Runco's contributions provide us with a good example of a *strategy of simplification* (Morin, 2008a, 2008b). The strategy of simplification involves reduction and disjunction: *reduction* to what is considered to be essential (the focus on an "actual mechanism," in Runco's case) and *disjunction,* or separation from the unnecessary influences or unnecessary effects, in this case particularly anything considered "social."

My own approach goes in the other direction of disciplinary specialization. It is a strategy of complexity that embraces transdisciplinarity. Transdisciplinarity is an emerging approach to inquiry, and there are already emerging schools with quite different approaches (Augsburg, 2014; Klein, 2004; Martin, 2017), many of which involve tackling so-called "wicked problems" with research teams. I refer to my specific approach as *Integrative Transdisciplinarity* (Montuori, 2010, 2013a; Montuori & Donnelly, 2016), which focuses more on how researchers and practitioners, or scholar-practitioners (Donnelly, 2016), can make sense of the enormous amount of research scattered in different disciplines and sub-disciplines to address issues whose complexity cannot restrict them to one discipline. Integrative Transdisciplinarity does not reject disciplinary specialization but complements it. It seeks to connect and contextualize knowledge from a plurality of specialized sources pertinent to an issue at hand.

Along with scholars who specialize, we also need scholars who "weave together" what exists within disciplines, as well as related works in other disciplines, so that it can be applied to real world issues. Integrative Transdisciplinarity is therefore a form of "scholarship of integration" (Boyer, Moser, Ream, & Braxton, 2015). This weaving together also requires an exploration the underlying assumptions of the perspectives informing any research project, as well as the range of possible perspectives and frameworks with which any topic might be approached. I call this the "meta-paradigmatic" dimension of Integrative Transdisciplinarity. The strategy of simplification seeks to *extricate correlates*, as Runco puts it, whereas Integrative Transdisciplinarity sees creativity as a systemic, distributed, networked process and actively explores context and connections (Csikszentmihalyi, 2015; Glăveanu, 2014a, 2014b). This does not mean a rejection or a downplaying of the individual and a dismissing of genius and creativity for instance, in favor of a "social" view, where "social" is viewed as opposite and antagonistic to individual. It is rather an attempt to contextualize and connect creativity at all levels of inquiry, whether we are speaking of a network of ideas or of personality characteristics or relationships or the relation between all three (Montuori & Purser, 1999a).

I know from my own experience as a professional musician as well as from my research that the "mere influences" listed by Runco may be non-essential for a certain type of research and a certain kind of "purified" understanding of creativity, but they do constitute the warp and woof of reality for the professional musician. The strategy of simplification aspires to the traditional scientific ideal of variables isolated in the laboratory, unsullied by exogenous factors, for purposes of control and prediction (Ceruti, 2015). Integrative Transdisciplinarity draws on and addresses the lived experience of practitioners in context, in an approach that is *inquiry-based*, grounded in specific events and experiences (Montuori, 2010, 2012), rather than guided by the characteristics of a specific discipline (and thereby constrained and not able to address certain aspects of the actual phenomenon in question), and "in vivo" rather than "in vitro," to use Nicolescu's useful distinction (Nicolescu, 2008), drawing therefore on pertinent knowledge from research regardless of disciplinary origin (Morin, 2002). A complexity-based approach does not reject the need for prediction, but recognizes the inescapable uncertainty at the heart of emergent phenomena such as creativity, as well as in human knowledge more generally (Morin, 2008b).

In the mid to mid- to late 90s Ron Purser and I wrote a number of articles and edited two volumes about social creativity (Montuori, 1989; Montuori & Purser, 1995, 1996, 1999b; Purser & Montuori, 1999). We wrote about the need for a more contextual view of creativity, arguing among other things, for the importance of research on groups, relationships, and the creativity of women. We also debunked some of the excessive myths about "the lone genius" that dated back to Romantic ideas like "genius without learning" and "genius overcomes all obstacles." These ideas seemed to us clearly wrong, and certainly not particularly helpful to anyone, but they nevertheless continued to show up in popular views of creativity and in the media (Montuori & Purser, 1995). To my surprise, some critics described us as sociological determinists, eager to throw out research on the individual in favor of groups and women (Greening, 1995; Hale, 1995), even though we made it very clear that we wanted to connect and integrate, not replace. Despite our best efforts to argue for "both/and," meaning integrating, for instance, research on personality *and* groups or the larger zeitgeist (Simonton, 1999), our view was interpreted as "either/or." Creativity is either individual, or "social." This gave us an insight into how these historical oppositions also involved a particular zero-sum way of thinking, in which there were only two exclusionary options (Collins, 1998). Indeed, it was as if we had poked at one of the sensitive underlying pillars of a particular cognitive paradigm, tied up with issues of method, disciplinary identification, and even political, cultural and national

identity (Sampson, 1977, 2008). I recall several conferences in the U.S. during which my exploration of social creativity was referred to as "socialist" or even "communist." This would not have happened in Italy or Japan, for instance, where the self is conceived less individualistically, and the term socialist is not considered an insult. The role of national culture understanding the who, what, where, and how of creativity is a topic that deserves more research. Integrative Transdisciplinarity invites the integration of the inquirer in the research which means situating oneself as a research, becoming aware of one's assumptions and using the research process as a way to constantly confront oneself with one's assumptions (theoretical, methodological, personal, cultural, etc.), as well as limiting assumptions about one's own creative capacities.

Systems and Complexity

A very basic and useful differentiation in systems theory is between open and closed systems (Capra & Luisi, 2014; Von Bertalanffy, 1976). From this perspective, Runco and Weisberg propose to treat the individual as a fundamentally closed system. This is a time-honored tradition found also, for instance, in the study of leadership by psychologist Howard Gardner, a familiar name for creativity researchers (Gardner, 1995). This closed-system approach holds that everything outside the system in question (whether that is Runco's "mechanism" or Gardner's leader), is epiphenomenal. In other words, for all intents and purposes it is largely irrelevant. Interestingly, in this view some of the characteristics attributed to genius by the Romantics, such as "genius without learning" and "genius overcomes all odds and social obstacles," make more sense. The genius does not need to learn from others, and he will not be held back by anyone because others are fundamentally irrelevant, whether as sources of knowledge and inspiration or as constraints (Montuori & Purser, 1995). The opposite perspective is that of sociological determinism, where it's the individual who really doesn't matter (Simonton, 1999). In the philosophy of social science this is known as holism, the opposite of the individual focus, which is known as atomism (Fay, 1996). Holism is equally problematic since the homogenizing whole is closed to the complexity of the individual parts (Morin, 2008b). But if we choose to see the individual as an open system, the system's relations with its environment also become the subject of study. In a complex approach, the focus is not on parts or whole, but on the parts and the whole, and the relationship between the two (Morin, 1990, 2008b). This leads to studying processes and interactions, using a relational view, not

starting off with static assumptions about agency. The decision to study a system as either open or closed is made by the researcher. In an increasingly pluralistic research environment, with creativity studied from many different perspectives, it's necessary be more explicit about our assumptions and the choices we make when we make these distinctions.

Purser and I used a systems approach in our critique of the "lone genius" myths, arguing that the Romantic view of the genius is a closed system approach, with the negative view of the "other" in the self-other relationship so common in North-American individualist culture (Sampson, 2008). As Traber (Traber, 2007) writes about the United States, "one of the nation's ruling myths continues to be that the self-contained individual is unconstrained by society, culture, and history" (p. 1). When Purser and I approached the topic of social creativity, one of our goals was to highlight the importance of environments that are supportive of creativity (Montuori & Purser, 1995). We showed how with an exclusive focus on the individual, less attention was paid to how to create environments that support creativity, both in research and in society. Paradoxically this focus on the individual meant that the historical difficulties of creative individuals in societies not attuned to creativity, and social contexts that were not supportive of creativity, were not studied and understood sufficiently. If one assumes that the environment plays no role in creativity, the concept of an environment that supports creativity doesn't make sense. Research on what Arieti called "creativogenic" environments (Arieti, 1976), has now emerged in the field of business innovation (Amabile, 1998; Amabile, Conti, Coon, Lazenby, & Herron, 1996; Anderson, Potočnik, & Zhou, 2014; Erez & Nouri, 2010; George, 2007; Perry-Smith & Shalley, 2003; Woodman, Sawyer, & Griffin, 1993). Research on creative groups has emerged mostly in management and sociology (Bennis and Biederman 1998; Sawyer, 2008). With creativity research scattered in many different disciplines, the importance of integration across disciplines seems ever more necessary.

In sum, the strategies of simplification and of complexity represent different approaches to creativity. The strategy of simplification seeks the *sine qua non* of creativity. Everything else is unnecessary. The strategy of complexity takes the following statement by Barron seriously:

> The psychology of the individual, the person, is the study of a world in itself. Yet, that world intersects and intermingles with the world of other individuals, so that very soon we must consider community, habitat, the intersection of the personal with cultural history, expectations of the future, and perhaps above all else in the human case, values and philosophy of life. (Barron, 1995, p. 6)

The sociologist Howard Becker started his book *Art Worlds* by reminding us of the credits that follow a major motion picture (Becker, 2008). The list is long, usually takes several minutes to complete, and gives some sense of who and what it took to make the movie appear on our screen. Creativity here is more distributed (Glăveanu, 2014a). It cannot be reduced to a lone genius, even if for convenience or (cultural) habit we talk about a Martin Scorsese or Federico Fellini or Steven Spielberg film, in the same way we might talk about an Armani suit or a Stella McCartney gown. As Morin reminds us, complexity in this sense is not an answer, or a solution (Morin, 2008b). It is a challenge to approach the world in a way that does not "mutilate," that doesn't simplify to such an extent that we have a limited and limiting perspective which, for the sake of simplicity, removes so much from our subject that it is in some ways unrecognizable. It is a challenge that I believe will turn out to be especially fruitful in the case of creativity, because we can see the ways in which the exclusive, closed system focus on the individual gives us a limited view of creativity.

What Individual? Whose Society?

Disciplinary research tends to be *intra-paradigmatic* rather than meta-paradigmatic, meaning that it stays within the confines of one paradigm and mostly does not question its own deeper philosophical sources and foundations (Montuori, 2005a). This is most obvious perhaps in the way concept of the individual has been used in creativity research with the assumption that there is largely unquestioning agreement about what constitutes an individual, and the assumption that one can unproblematically differentiate between the individual and society, as if they were separate domains. As a result of this dichotomous split, "social" creativity is neatly distinguished from what it is not, namely individual creativity. But whose individual? What are the characteristics of this individual that can be completely separated and isolated from "the social"? How has the individual been constructed in the psychology of creativity? This is an important exploration directly related to the emergence of a more "social" perspective: What exactly is meant by "individual" and "society," since these are by no means unambiguous, uncontested concepts (Elliott, 2007, 2015; Heller, Sosna, & Wellerby, 1986; Lindholm, 2007; Westen, 1985, 1992). By touching on these questions, creativity engages in dialogue with scholars in a variety of disciplines, and the necessity for *meta-paradigmatic* awareness can become an opportunity for dialogue. One obvious question is whether it is actually possible to be a self without also being

"social." Social psychologists Markus and Conner (Markus & Conner, 2014) offer an unambiguous answer, stating that "You can't be a self – even an independent self – by yourself" (p. 44).

In psychology there are already many voices arguing for an understanding of the self that is more relational (Gergen, 1994, 2000, 2009; Glăveanu, 2010, 2011a, 2011b, 2016; Heller et al., 1986; Rogoff, 2003; Sampson, 2008; Vygotsky, 1980). Research has drawn our attention to the way women have been socialized to be more relational (Code, 1991; Doi, 1973; Gilligan, 1982; Hare-Mustin & Marecek, 1988; Matlin, 2010). Sociologists have also presented a different understanding of the self, and critiqued the view of a solitary, self-sufficient self (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985; Elliott, 2015; Slater, 1990). The range of cross-cultural differences has been extensively studied and raises more questions about the importance of studying different "selves" (Markus & Conner, 2014; Markus & Kitayama, 1991; Marsella, DeVos, & Hsu, 1985). From a systems perspective, a key question, as we have seen, is whether we choose to approach the individual, or whatever system is the subject of our inquiry, as a closed or an open system. A sustained discussion of this plurality of approaches to the individual-society relation is much needed, and I suspect it may be helpful in breaking down the traditional polarization between self and other, individual and society (Montuori & Purser, 1996; Ogilvy, 1992).

Approaching some of the historically most intractable dichotomies in social science through the lens of creativity may be biting off a sizable chunk, but it can also be particularly generative (Donnelly, 2016; Fay, 1996; Glaveanu, 2012; Ogilvy, 1989; Ping, 2018). Creativity research points to human capacities and human possibilities, and as a result can lead to a rich reflection on what it means to be human. Examples can be drawn from eminent as well as everyday creativity, and our assumptions about creativity take us to some key terms like "creation," "creator," and "creature" (Barron, 1999; Fox, 2004; Montuori, 2017). These terms take us right back to the beginning of it all, and to core beliefs about self and world, as well as our conception of the very nature of the Universe, and God (Davies, 1989; Kaufman, 2004; Peat, 2000; Peat, 2002; Peat & Bohm, 1987; Swimme, 1985; Swimme & Berry, 1994; Swimme & Tucker, 2011). Barron showed how our understanding of creativity as lone genius can be traced back to God the lone creator and the seven days (Barron, 1999; Ward Jouve, 1998). This broader approach makes our inquiry into creativity spill over into a variety of disciplines, but it can provide an important entry point to key questions about existence and/as creativity.

Women and Creativity

Although a transdisciplinary approach is valuable in almost any context, the creativity of women is an example of a subject that lends itself particularly well to a transdisciplinary approach (Montuori & Donnelly, 2016). Here is the strictly disciplinary perspective of a leading psychologist's view of creativity and gender: "Creativity, particularly at the highest level, is closely related to gender; almost without exception, genius is found only in males (for whatever reason!)" (Eysenck, 1995, p. 127). Without addressing history and the realities of the social, economic, and political environment, without taking into account the way women were, for the longest time, and in many cases still are, excluded from participation in the very domains in which one could be identified as a genius, one might in fact come to the conclusion that women are simply not creative—or at least not capable of genius-level creativity (Baer, 2012; Battersby, 1989; Eisler, Donnelly, & Montuori, 2016; Halstead, 2017). From an exclusively disciplinary, psychological perspective, the historical and social complexities that have stood in the way of women's creativity cannot be accounted for, yet the result is a view of genius and gender is presented as a final statement on the issue rather than the limited perspective of one discipline based on its limiting assumptions and limited scope. Eysenck may add "for whatever reason," but I'm probably not reading too much into it if I suggest that this is simply because he is not stating explicitly his belief that women are just not as creative as men. We consequently have to ask ourselves some questions. To what extent do the findings from one discipline inappropriately claim to have the final say about a subject, with no reference to potentially contradictory or mitigating findings in other disciplines? Does the current view of creativity reflect a certain white, male-middle class Euro-American perspective? Does the way research abstracts creators from their context and fundamentally ignores social, political and economic conditions actively ignore the realities of women, people of color, and groups that have been marginalized by society (Code, 1991; Sampson, 2008)? And does it actually ignore the realities of most white men as well? If we add to this the Romantic conception of genius overcoming all social obstacles (which today might be expressed as "if you're really good, you'll be discovered/hired/successful") we can see that the obstacles to women's creativity, and the obstacles to understanding those obstacles, are considerable.

Ravenna Helson (Helson, 1990) argued that understanding creativity in women.

> requires attention to the social world, to individual differences in motivation and early object relations, and to changes in society and the individual over time. In fact, we believe that the study of creativity in general needs all of these directions of attention. (p. 57)

Understanding creativity in women, from Helson's perspective, requires explorations of multiple topics, and I would argue that they in turn need to be woven together to provide a sense of the complexity of the issue.

Networked Society, Networked Self, Networked "Social" Creativity?

About 10 years ago I began to notice that when asked to express their views about creativity, young people in the U.S. and Europe rarely mentioned "eminent" creatives, unlike the Picassos or Einsteins mentioned by their Baby Boomer predecessors (Montuori, 2011). These days Steve Jobs is the rare eminent name. It's also interesting to note that for baby boomers, business people and parents (frequently mentioned by younger generations), would never have appeared in a "most creative" list. The younger generation referenced individuals who were often friends and family engaging together with others in "everyday creativity" (Richards, 2007; Runco & Richards, 1997), or more broadly, everyday, everyone, everywhere, relational creativity (Montuori, 2011).

It appears that individuals who have grown up in what has been called the networked society (Castells, 2009; Taylor, 2003) may think of and experience creativity differently than their Baby Boomers predecessors (Gardner & Davis, 2013; Montuori, 2011; Rainie & Wellman, 2012). I've found informally that even some Boomers appear to be changing their views as a result of the new social environment and its networking technologies. Whereas for Baby Boomers creativity is associated with "eminent creatives" such as Einstein, Van Gogh, or individual popular artists, in today's "participatory" culture the focus is not so much "eminent creatives," but on participatory, relational processes with peers and family, and the "makers" movement. Making is increasingly about connecting (Gauntlett, 2011; Jenkins, 2008, 2009).

One way to illustrate the generational difference between the two experiences of creativity is through two iconic events, Woodstock and Burning Man. In 1969, thousands of Boomers made their way to Woodstock to spend a few days enjoying their musical heroes in perhaps less than favorable circumstances. Burning Man, which started in 1986 and blossomed in the 90s

and early 00s, offers a different picture, although in perhaps similarly challenging circumstances. At Burning Man everyone is participating in a collaborative creative project without capital S "stars." At Burning Man, every participant is a "star," dressed outrageously, and sometimes minimally, contributing to the creation of an environment that valorizes creative expression, as well as the creation of temporary temples, installations, events, and encampments. New "Burner" identities emerge and disappear, or at least become dormant upon returning home until the next "Burn." The music of the Woodstock era was punctuated by classic guitar solos and more generally by displays of individual virtuosity (Hendrix, Clapton, Garcia, etc.), whereas the music of the Burning Man era replaces the guitar solo with sing-along chants (think Coldplay). Electronic Dance Music, popular at Burning Man, focuses on grooves for dancing and less on musical virtuosity and complexity. I am by no means suggesting that musically this is an improvement, of course. I believe it does tells us something about U.S. society and the changes brought about by the networked society which are leading to a more networked, less dualistic understanding of self and society (Rainie & Wellman, 2012). It points to a greater openness and a greater understanding of the relational dimensions of creativity, as well as a shift towards what Leadbeter called a relational, "we-think" society of mass innovation rather than mass production (Leadbeter, 2009). The way creativity manifests *in vivo* is very important, particularly in this age of considerable social transformation. The point here is not that sociologists should study the social and economic dimensions of creativity, but that it is possible to study the complex phenomenon of creativity in the twenty-first century using a multidimensional transdisciplinary approach.

Creativity Everywhere?

Looking back on the last 30 years or so it's clear that creativity has now become a hot topic, and it will remain so for the foreseeable future. I continue to applaud and encourage increasingly specialized and focused research, but there's also no escaping the need to integrate and to make sense of what all the existing research is telling us, to connect different research strands, to open up dialogues between them, as well as with practitioners. With creativity becoming such an important global phenomenon, the source of technology and a driver of the economy, it becomes essential to ask what is meant by creativity not just in terms of its specific mechanisms, but also in terms of the ethical dimension, asking what and how we are creating, why, and for whom. In order to understand the complexity of creativity, scholars will

need to collaborate and ourselves become skilled in social creativity. Transdisciplinary dialogue and collaboration will require that we challenge our own (as well as others') assumptions, have tolerance for ambiguity, make connections, contextualize, critique, and create.

Creativity is the very fabric of society today. As an example, the sociologist Anthony Elliott, finds that "reinvention" is now a dominant feature of life (Elliott, 2013). Individuals engage in "self-creation," exploring the "art of life" as they reinvent themselves through practices like yoga, meditation, therapy, and cosmetic surgery (Elliott, 2008). They negotiate career changes (voluntary or involuntary), often in organizations that are reinventing themselves to become more adaptive and successful, to entire towns and cities looking to revitalize themselves, there is a desire to reinvent and re-create as old models (old selves, old identities) are failing and new ones are being sought. Who creates, how and why? Who benefits? What are the processes and criteria for creation, and how do we understand, experience, and apply the creativity in reinvention? What do we believe are the limits to what we can and should create, and what are the goals we pursue (e.g., bioethics)? This brings us into a complex set of ethical issues that may be less amenable to a traditional scientific approach, but that nevertheless need to be addressed—and once again cannot be fully reduced to the scope of a single discipline.

I believe taking social creativity seriously, certainly from the perspective of Integral Transdisciplinarity, involves entering the fray of the discourse and practices of creativity in the world. It means, among other things, exploring the way creativity is used and abused, exploring the implications of thinkers who, under the admittedly ill-fitting umbrella of postmodernism, have told us about "the death of the author" and "the death of the subject," and the way creativity in the arts has increasingly become associated with sampling and bricolage (Kearney, 1988; Megill, 1985; Rosenau, 1992). Where does "creativity" fit into the larger social and intellectual trends? The term creativity has not been popular with cultural critics because of its Romantic associations with concepts like "originality" and "genius" which have been seriously attacked in a variety of contexts and for a variety of reasons (McMahon, 2012; Pope, 2005). At the same time, the term creativity is used with increasing frequency by physicists, biologists, as well as philosophers and theologians, which gives us a sense of its relevance these days and that it may be moving from a rare quality found in only a few unusual individuals to the very nature of what it means to be human, and of the Universe itself, (Bocchi & Ceruti, 2002; Bocchi, Cianci, Montuori, & Trigona, 2014; Fox, 2004; Peat & Bohm, 1987; Swimme, 1985, 1996; Swimme & Berry, 1994; Swimme & Tucker, 2011). To the extent that researchers in the psychology of creativity does not

at least inform itself engage these social and intellectual developments, the field risks becoming increasingly marginalized. As I have already indicated, studies of creativity are now in full swing in disciplines such as management and sociology, not to mention the new kids on the block like Design and Social innovation, and of course, neuroscience (Brandt & Eagleman, 2017; Dietrich, 2015; Goldberg, 2018). References to research in the psychology of creativity are often quite scarce in these works.

Conclusion

The study of creativity has arguably never been more exciting. But, like so much else in the world, creativity is breaking down the very categories we have used to make sense of it. This is not an insubstantial part of the excitement, but also creates a degree of confusion. As a result, creativity is not what it used to be. It has certainly changed a lot since the days when I was constantly told that "social creativity" is an oxymoron, or, for that matter, that studying creativity was really a marginal activity. The who, what, where, when and how of creativity are being challenged, and new generations are growing up with a different understanding and experience of creativity. As creativity continues to become more important, creativity research can become, indeed arguably has an obligation to become more self-reflective and aware of its paradigmatic assumptions, and at the same time become more relevant, more engaged in the pressing global and local challenges we are all facing. Creativity research can also become more open to a multiplicity of voices and a multiplicity of approaches—one need only think of new disciplines such a Design and Social Innovation that are deeply connected to creativity, but often seem to draw on organizational practices and popular creativity books more than current research in the psychology of creativity. Dialogues are important not just between scholars but between scholars and practitioners, to find ways to integrate, communicate, and apply research findings, and have the experience of practitioners inform scholars (Donnelly, 2016). In this difficult historical moment, I believe the pressing challenge is to engage and make a difference, both in discourse and practice.

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26

Creativity as Dissent and Resistance: Transformative Approach Premised on Social Justice Agenda

Anna Stetsenko

"Freedom is always the freedom of the dissenter"
Rosa Luxemburg

In this chapter I suggest that creativity, like freedom, is always about dissent, that is, about resistance, discord, challenge, critique, and ultimately, about the acts of questioning and moving beyond what is given, a process that transcends (or deconstructs) the status quo and its entrenched structures, phenomena, and elements. Creativity is thus akin to defiance and disobedience, even rebellion, on a par with the revolutionary energy of transformative agency that furnishes our world and is the province not of the select few but of all human beings. The rationale and conceptual support for this claim will be elaborated in what follows.

Creativity is an important and popular yet complicated and illusive topic for psychology and other fields that use this term in their conceptual apparatus. Despite some points of agreement, definitions of creativity vary greatly across time and frameworks and no full consensus on its core characteristics and mechanisms is presently in sight. This is not a problem in and of itself because a unified and universal definition is neither desirable nor likely in conceptualizing most (perhaps any) of the categories in social sciences where

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what we study is a highly peculiar realm of phenomena and processes, unlike those in natural sciences such as chemical compounds and biological cells. This realm is closely entangled with research practices, discourses, languages, folklore, common sense, and conceptual traditions of professional subcultures, which are themselves parts of the larger sociopolitical and cultural contexts including complex networks of terms and categories within which particular concepts uniquely find their meaning through relations to others. The highly and inordinately complex character of the subject matter, phenomena and categories in psychology and neighboring disciplines renders diversification of viewpoints and multiplicity of positions legitimate and valuable while establishing the futility of searching for a single answer. Paraphrasing Gergen's words about the concept of the self, one can say that "the argument is not that our descriptions of [creativity] are objectively shaky, but that the very attempt to render accurate understanding is itself bankrupt… Whatever [creativity is] is beyond telling" (1991, p. 82). Danizger (1997, p. 5) has astutely commented on this topic, writing that a substantial body of evidence

> throws doubt on the universal validity of many of the categories with which the discipline of Psychology has been operating. …There is a certain arrogance in taking it for granted that, alone among a myriad alternative ways of speaking about individual action and experience [including creativity], the language of twentieth-century American Psychology accurately reflects the natural and universal structure of the phenomena we call 'psychological'.

In my earlier works, I developed similar arguments that psychological constructs describe objects that differ markedly from those in natural sciences because these "objects" are more intimately dependent on research practices and therefore, change as a result of claims and questions posed about them (Stetsenko, 1990; see extensions in Stetsenko, 2016). With this complexity in mind, what is possible and desirable is to situate the concept of creativity within investigative projects that attempt to account for certain significant aspects and dimensions of human conduct and functioning, while paying attention to the specific tasks that "creativity" is meant to achieve within these projects and inquiries. Leaving aside the difficult task of exploring the uses of the "creativity" construct across cultures—an important endeavor that is beyond the scope of this chapter (for vivid surprises that await researchers undertaking such tasks, see Danziger, 1997)— the goal in the present analysis is different. It is to expand the applicability for the construct of creativity within an expanded range of investigative projects than is typically the case, to more fully bring about its explanatory potential.

The idea is to lodge the construct of creativity in the project of addressing the main constitutive features of human development and conduct as having to do, at the very core, with their essentially non-adaptive and non-conformist nature. This project is also, and non-coincidentally, about acknowledging and ascertaining fundamental equality of all human beings. Creativity in this project is used to highlight something we all share as human beings—the formative dimension of what is commonly referred to as the human condition, what being human means. The critical point is that no human action is possible without a significant degree of creativity and ingenuity even in the so-called everyday situations when we face putatively common tasks in our presumably ordinary lives, because no situation and task is ever completely common and no life is ever totally ordinary. In this sense, studies of outstanding individuals, rather than affording a glimpse into the exceptional processes and regularities that are beyond the typical range of human functioning, can instead be understood to illuminate the workings of the mind that in fact all humans can be credited with, revealing their amazing, yet at the same time quite common, features shared by *all* people.

It is important to explicitly include creativity among the most basic, formative constituents of human development, in acknowledging that development is agentive and innovative through and through, instead of seeing it as an exclusive property of only uniquely gifted individuals. This importance has to do with the need to make steps forward in developing non-elitist, anti-racist, and empowering attitudes, discourses and practices including in nurturing creativity through an academic curriculum for *all*. As is well known, presently a very small proportion of students are afforded opportunities to develop their creativity and, even more problematically, there is a marked inequity in that students from historically disadvantaged populations have been left particularly vulnerable to this lack of opportunities (Beghetto, 2010). This worrisome trend is part of the larger dynamics in which racial segregation in the US schools and neighborhoods is a driver of growing inequality and social division. These dynamics are reversing previous gains and exacerbating inequalities through policies that disenfranchise populations of color and the poor (Darling-Hammond, 2007) so that "the children who most depend on the public schools for any chance in life are concentrated in schools struggling with all the dimensions of family and neighborhood poverty and isolation" (Kucsera & Orfield, 2014, p. iii).

It is to mitigate this and similar gaps, as part of "a new civil rights agenda" (Orfield, 2014, p. 276), that I am offering steps towards a concept of creativity compatible with the tenets of fundamental equality and social justice, for this concept to be used as part of a critical-practical project of social

transformation and change. The effort is to provide conditions for making the assumption of equality true, including at the level of supportive theoretical constructions, as one of the steps in the overall project of creating equality in society and education (for a related though not identical approach, see Rancière, 1991). This approach does not take the ideal of equality as an abstract notion, nor tests it in some detached, neutral way. Instead, it *takes a stand* on and commits to matters of equality as an analytical step that leads all other methodological strategies, conceptual turns, and theoretical choices, all while attempting *to realize* equality in the process of theory- and knowledge-building. This is consistent with the gist of Vygotsky's Marxist project that can be seen as laying grounds for a novel type of research devoted not to a pursuit of knowledge per se but to creating knowledge as part and parcel of a larger-scale social transformation that self-consciously contributes to creating new forms of social life and practices based in principles of social justice and equality. Along these lines, creativity studies can be revolutionized to challenge the many myths of its own creation.

The Present Landscape in Creativity Research: Discerning Research Agendas

Traditionally, the construct of creativity comes about in research and theories attempting to account for novelty including as it encompasses originality, uniqueness, transgression, innovation, and departure from established norms and accepted standards. Yet further specifications typically limit creativity to the creation of novelty in problem solving—finding specific solutions while most often tapping into the quality of resulting products such as in the arts, sciences, and technologies. In this emphasis, apart from some caveats, a long-standing consensus in psychology and other fields is that "creativity is defined as a novel yet appropriate solution to a problem or response to a situation" (Moran, 2008, p. 74).

In this emphasis on problem-solving and its products, there is perhaps inevitably a certain managerial, commercial taste to the studies of creativity associated with instrumental business interests and other market-driven motivations. That some of the popular approaches such as the investment theory of creativity (Sternberg, 2012) define creative people in explicitly market terms, as those who are willing and able to metaphorically "buy low and sell high" is an expression of this trend. Further, as noted by Craft (2005), the globalized market approach can be discerned even within education policy

initiatives that acknowledge the need to include creativity in the school curriculum, with potentially destructive and ethically questionable ecological and cultural consequences (Beghetto, 2010). Even more critically, the motivation behind many studies of creativity has been to diagnose qualities of unique individuals capable of outstanding performance in producing novelty and innovation. This is especially the case in psychometric, historiometric, and management approaches to creativity that for decades have dominated research on this topic and continue to do so. The more or less explicitly present goal (or at least its non-coincidental corollary) to establish certain hierarchies among society members in their basic capacities to produce results is embedded within the market-based ideology of unequal societies that are premised at their very core on exactly such hierarchies. This emphasis follows with the trend of free market ideology to concentrate on the agency of human beings in augmenting production possibilities. The question of *how* and *why* certain products and corresponding capacities should or could be valued over others is rarely raised in this kind of approach. The typical consideration is that it is society that will make judgements of this kind in some sort of a consensus.

The combined emphasis in both research and theories of creativity on problem-solving and corresponding "productivity" (in connotations of commodities and commercial values), on hierarchy among society members in their capacities for creativity, and on the role of social consensus in valuing creativity, are all quite ironic because this overall position is conspicuously in sync with the ethos of global capitalism with its neoliberal economies and corresponding sociopolitical policies and, more generally, with the currently reigning status quo. It is also quite in sync with the long-standing focus on individual capacities within mainstream approaches in psychology that since its inception has been quintessentially a psychology of the individual. Moreover, as decades of critical works have convincingly demonstrated, not only do psychologists rarely challenge the existing order of things including prevailing social attitudes, beliefs, and discriminatory biases, but they actively endorse and facilitate the reproduction of the status quo (cf. Cushman, 2012). In creativity research this is expressed, for example, in that "despite all of this creativity-related discourse and activity among practitioners, policymakers, and scholars, surprisingly little attention has been paid to the question of *why.* Why value creativity? What is the role of creativity in society?" (Moran, 2010).

That creativity research does not significantly deviate from the overall ethos prescribed by the presently dominant ideological, sociopolitical, and disciplinary status quo is a reason for all of us to pause and reconsider the roads not yet fully taken, that is, the roads of "pushing the envelope" more through

critiquing the canons, transcending the accepted rules, interrogating achieved consensus, and otherwise moving beyond the status quo in all of its dimensions and aspects including research and extant mainstream approaches. Given that creativity is admittedly about novelty, innovation and transgression, the field and we all as a research community arguably would benefit from positioning ourselves more as outsiders vis-a-vis the mainstream psychology and the broader reigning ideologies, even perhaps as rebels who are not prepared to settle with what presently exists and instead, strive for what could be in an open and daring challenge to the status quo. This is a call, if you like, for creativity research to become more in sync with its own topic, that is, to become more creative and thus, more daring.

There have been several positive changes in research on creativity in recent decades in this direction. One of these changes has been a transition from a traditional focus on isolated individuals to a focus on groups, interactions, and social and cultural contexts of creativity including the resulting attention to its situated, distributed and collaborative nature (e.g., Connery, John-Steiner, & Marjanovic-Shane, 2018; Sawyer, 2015; for elaborations, see Glăveanu, 2010). This shift has been part of a broader "sociocultural turn" in the social sciences that occurred especially from the mid-1980s through the 1990s, though it can be traced back to seminal works by a range of scholars including Dewey, Piaget, Vygotsky and Mead (cf. Kirschner and Martin 2010). The second positive development in the field of creativity away from accepted and entrenched canons of mainstream psychology has been the emerging focus on the ethical and moral (normative) issues. For example, the recent works have sought to merge the realm of creativity with the imperative of responsibility (Gardner, 2007; cf. Moran, 2010). This same shift can be discerned in works that draw attention to the need to explore the "why" of creativity, the roles it plays in society in interaction with the distribution of power, and the relationship of creativity to the future (Moran, 2010).

The third notable shift has drawn attention to a whole range of creative acts and expressions that are not confined to the forms of "eminent creativity" only. In addition to a traditional focus on "creative greatness" (so called *Big-C* creativity), current studies also explore everyday creativity of the "average" persons (so called *little-c* creativity; Kaufman & Beghetto, 2009). In addition, Kaufman and Beghetto (2009) expand this line of research by adding yet another construct to the inventory of creativity descriptors—that of the "mini-c" creativity that highlights the personal (cf. Vygotsky, 2004) and developmental aspects including openness to new experiences, active observation, and willingness to be surprised and explore the unknown.

All of these shifts represent much needed expansions on the notion of creativity that help to dispel its traditional mythology. Yet more work needs to be done to consolidate, advance and warrant alternative approaches, especially along the lines that challenge assumptions of inequality and natural hierarchy (for some parallels, see Glăveanu, 2017). For example, this pertains to the "mini-c" approach, with its premise that the creative potential of the *many* should not be overshadowed by the creative accomplishments of the *few*, still preserving some hierarchy separating those who are deemed to be creators (albeit admittedly numerous) from the rest of us.

What is needed, in my view, to develop theories of creativity in consonance with and as part of the critical-theoretical project of advancing radical notions of democracy and equality, is no less than a philosophically grounded revision, indeed an overhaul, of the major assumptions about human development, mind, the nature of knowledge and, ultimately, reality itself—away from assumptions of passivity, accommodation, quietism and adaptation to the status quo. This task is especially urgent given the current situation marked, I suggest, by a transition away from the past several decades permeated with the guiding ethos of presumed stability and belief in the global free-market fundamentalism (brought about by the exuberant optimism after the end of the cold war reflecting the "end of history" zeitgeist) and towards nascent social movements fueled by social justice agendas that are challenging the status quo while searching for theoretical supports needed to sustain them.

Moving Beyond: The Transformative Activist Stance

Many entry points for a theory of creativity steeped in the ethos of equality and social change are provided by Marxism and by Vygotsky's works that were developed in continuation of this philosophical system. These works were developed as part of "revolutionising the existing world, of practically attacking and changing existing things" (Marx, 1978, p. 169), laying grounds for linking particular understandings of phenomena and processes such as creativity with value-laden conceptions of a *desired* formation of both self and society. Their approach was also aimed against the notions, still prevalent today, that have their basis in the ethos of passive adaptation and "the romance with fixedness" (to use Gergen's, 1991, expression)—the idea that human action is determined by a relatively fixed set of internal dispositions and an equally fixed set of external structures and influences. The alternative outlined

in Marxism was to attend to what Bakhtin later termed the radical "ungivenness" of human experience and, it is important to add, the radical ungivenness of the world itself. It is this ethos of dynamism and transformation, coupled with the passionate commitment to human equality and social justice, that permeated Vygotsky's works.

One way to further advance this approach at the level of ethics, ontology, and epistemology, while overcoming some of its gaps and contradictions by capitalizing on activism and creativity enacted in transformative agency, has been suggested in my works on transformative activist stance (TAS). To give a brief account (for details, see Stetsenko, 2008, 2010, 2012, 2015, 2016), the TAS builds on Vygotsky's ideas about collaborative practice as the key grounding for human development, Bakhtin's notion of ethical becoming (or *postuplenie*; for elaboration, see Stetsenko, 2007; Stetsenko & Ho, 2015), and Freire's critical pedagogy—as these are further integrated with insights from contemporary works in ecological, dynamic, feminist, sociocultural, and critical approaches. On this foundation, the following expansions are suggested.

First, in this approach, the world is understood to be a constantly shifting and continuously evolving terrain of social practices enacted and reenacted by people acting together in their joint struggles and strivings. That is, the world is posited to be an ongoing and ceaselessly changing process, or a collective forum, composed of dynamic and ever-changing communal practices stretching across generations yet always enacted anew. These practices continuously evolve in history as one dynamic and ceaseless flow of a *cultural-historical praxis* that connects all individuals and all generations in one unified, ongoing, open-ended pursuit—the pursuit of humanness, including its individually unique expressions, as a project of collaborative becoming. Each person entering this collective forum as a flowing terrain of collaborative social practices, and joining in with its dynamics, right from birth, is the core condition and foundation for personal becoming and development as a member of the human species and agent of human civilization in its historical unfolding.

Second, these collective and open-ended collaborative practices, although social through and through, are understood to be realized through unique contributions by individuals (themselves social to the core, in light of the previous point), each acting from one's own irreplaceable position and stance though always in an ineluctable interaction and reliance upon, as well as an inextricable alliance and coordination with, other community members (both immediately present and long gone). Each person not only enters these social practices, but enacts and brings them into *real*ization (literally, makes them *real*), gradually co-authoring these practices by making a difference (however slight or large) in them.

Third, by entering these social practices and realizing them, each person *thereby* also realizes oneself in the *same* process of a joint and collective becoming. That is, each person comes into being by co-authoring social practices through enacting, realizing, and transforming them by individually contributing to and thus, mattering in them. It is within creative processes of co-authoring the world by contributing to its collective dynamics that people simultaneously *co-author themselves* in becoming individually unique and irreplaceable within the communal world shared with others, in one bidirectional spiral of self- and world-creation. Note how the juxtaposition of the social versus the individual is transcended in this approach: The personal becoming turns out to be contingent on mattering in profoundly social processes, while the social-collaborative practices are acknowledged to be contingent on individual contributions to them (hence the notion of the "collectividual" as one composite process in which the social and the individual are indivisibly merged; see Stetsenko, 2013, 2016).

Fourth, because the world is understood to be composed of collective practices that involve complex social dynamics needed to coordinate shared activities—and thus inevitably entail dimensions of power, conflict, and struggle—the primary emphasis is on people en-*countering*, con-*fronting,* and *overcoming* the circumstances and conditions that are not so much given as *taken up* by people within the processes of actively grappling with them and thus, realizing and bringing them forth in an active and agentive striving to change and transcend them. Finally, the relevance of the *forward-looking* activist positioning vis-à-vis the future is highlighted—what we imagine, deem important, strive for, and seek—along with a commitment to bringing this future into reality. The core constituent of human development consists in taking stands and staking claims—the process of *making up one's mind* as literally a process through which human subjectivity comes about. These are processes of *authorially and creatively taking up* social practices, via contributing to changing them, by individuals qua actors of society and history in always creative, novel, agentive, and transformative ways.

The resulting view suggests that it is directly through and within the dynamic process of transforming and co-creating the world that people simultaneously come to be, to know and to act, as active agents of their own lives and society, that is, as agentive and responsible actors of social practices. We do not passively dwell in the world, but instead co-create and co-author it together with other people, while inevitably changing it. Based on these broad premises, the processes of knowing, being, and doing are acts of creative transformation contingent on how each person contributes to the social, communal practices by changing their dynamics, creating novelty, and leaving one's

own indelible traces in them. This understanding contrasts with explanations that premise human development on passive processes of people being simply situated in context while merely experiencing what is "given" or passively and obediently reacting to influences coming from the outside. A focus instead is on creativity and novelty, suggesting that our acts and deeds do not just take place in the world; instead, we simultaneously bring forth the world and ourselves in a spiral of a mutual, bidirectional becoming.

Creativity and Transformative Agency

Because all major ontological and epistemological positions on both human development and the nature of reality are radically shifted from the notion of adaptation to transformation, the TAS opens ways to understand the centrality of creativity in human development. In this approach, because *reality itself is in the making*—our own creative and imaginative making—a rigid opposition between creativity and imagination on one hand, and the world of "ordinary" life on the other, is eliminated. This is achieved by reintegrating these two realms through the ontological treatment of human life and development as a creative work (or a project) of a simultaneous self- and world-formation. The apparently great contrast between some putatively "brute" reality of what is taken to be the "real" world (somehow purged of human dimensions and "disenchanted") versus the world of imagination and creativity relies on an inadequate phenomenology of ordinary experience. The alternative conceptualization is accomplished through direct problematization of the notion of reality "as it is" in its status quo, which is replaced with the notion of reality as a contested terrain of social practices that are about struggles and strivings of becoming. This is a radical position even by Marxist standards because the world is taken to be profoundly humanized and inherently, at its core, imbued with human values, positions, interests, commitments and goals, all entailing creativity and transformative agency in place of passive adaptation. These dimensions are not considered to be added as a separate realm onto human conduct, nor onto the world in which this conduct takes place. Instead, communal and individual subjectivity and creativity are posited right at the epicenter of reality—the world in which we exist and which we come to know as we ourselves create it, *in the process of creating it*. The world is fully enmeshed with our collective strivings and collaborative projects, in a spiral of mutual historical becoming, wherein each individual act of being, knowing, and doing—unique, authorial, and irreplaceable as it is—matters.

The radical import of this approach is that it operates with the notion of creativity (and other expressions of human subjectivity such as agency, imagination, goals, hopes, desires, strivings and purposes) as fully legitimate, and indeed central, dimensions of reality. Although not directly present in Marx's writings, this approach is consistent with some of their creative readings such as by Bloch (1986, p. 7) who wrote: "Expectation, hope, intention towards possibility that has still not become: this is not only a basic feature of human consciousness but, … a basic determination within objective reality as a whole."

The TAS approach highlights that even our apparently mundane circumstances and activities in the course of the so called everyday life entail a de facto *infinite* spectrum of interactions, relations, dynamics, and circumstances that stretch across time with *immeasurable* and inherently *indeterminable* consequences, within a *boundless* variety of overlapping and multifaceted contexts that are *endlessly* complex, fluid, ever-changing, unpredictable, uncertain, contested, and shifting every step of the way.

Imagine a teacher entering an urban school in New York city today. What this teacher is encountering is typically a highly complex, ambiguous and uncertain terrain composed of activities across a wide spectrum of contexts and time scales, in relations with innumerable other people, both present and long gone and those yet to come, across immediate environments and the far stretches of the world. This teacher likely encounters students who come from various parts of the world, speak diverse languages, carry and embody complicated legacies of dislocation, immigration, disadvantage and discrimination that stretch back into history and across the globe. No less importantly, these students are not only inheritors of the past but also actors of their own lives and our common history projecting far beyond the present, who are making new realities and new histories in the future that is unknown yet is already in the making in each and every classroom. What the students and teachers encounter and realize in their classrooms matters greatly in infinite ways and is no less complicated, challenging and creative than any human endeavor anywhere in the world.

As is especially the case in a context like this, every act by each person is contingent and relies upon, as well as affects, innumerable others and has endless consequences, reverberating practically through the universe and across the ages. That is, even seemingly routine deeds by so called common people in what we are used to see as their supposedly utmost ordinary lives are *always* creative, often innovative, and not infrequently daring—all implying that actually *no* deed is completely routine, *no* person completely common, and *no* life completely ordinary. Indeed—truly *in deed*—no instance of human life,

activity and interaction is exactly like any other and no circumstance of life exactly repeats those in the past, never meaning the same thing nor carrying the same implications depending on when, why, how, what for, and for whom these meanings and implications apply. Just as language cannot be and in fact never is used in copying or repeating what others have said in the past, with every sentence being creative, original and unique, so is every human encounter and action always novel, unrepeatable, and creative.

Conclusions

There has been hitherto no theoretical perspective which unambiguously assigns creativity with a truly primary and constitutive (formative) role *simultaneously* in human development and in the dynamics of reality and social life. In drawing especially on Marx and Vygotsky and also Bakhtin, Freire, and other critical sociocultural scholars, the TAS begins to make up for this gap in highlighting agentive capacities for transformative change and creative agency by human beings as actors of self- and world/history-making. Some interesting parallels can be noted with other positions on creativity, for example, with Ryle's point that "it is part of intelligence to seize new opportunities and to face new hazards; to be, in short, 'not a tram, but a bus'. What I am describing is not something that is peculiar to a few distinguished persons" (quoted in Costall, 2015). Costall expands this insight suggesting to zoom in on "the human gift of not staying on the rails, and not *even* keeping to the same bus route" (p. 54). However, I would take this expansion even further to suggest that not only do we ride a bus rather than a tram while also not even keeping to the same bus route, as formulated by Ryle and Costall. In my view, we do not simply ride a bus or any other vehicle for that matter, on whatever route. Instead, we *drive* our lives in the directions we ourselves create, through contributions to the social world and in relying on its tools and supports, *while creating the route itself, along the way, for ourselves and others*. As I wrote in an earlier work (Stetsenko, 2016, p. 18),

> we all are not just passengers on …the train [or any other vehicle] of history—as if we were just gazing outside at the rapidly changing landscape while merely observing, coping with, and adapting to it. Instead, the train [or another vehicle] itself is made to move, and to move in a concrete though fluid and ever-changing direction, by the collective efforts of people who act together yet with each person mattering, in individually unique ways, at every step of the way, at every move of history. We are all actors who contribute to social practices, bring

> about their historical realization, and contribute to the future that is to come and, moreover, a future that is always already in the making, by us, *now*.

I would augment this quote now by insisting that we are in fact members of the crew. And to return to the goal of connecting creativity construct with the ethos of social justice and equality, which is the main purpose of this chapter: In the perspective outlined herein, there is no impenetrable walls separating any one person from the most prolific and creative "giants" history has ever known. In fact, many perceptive teachers have long since known that any child is a genius, if perhaps still in the making. To quote one teacher, John Taylor Gatto (2001, p. xxiii), "genius is as common as dirt. We suppress genius because we haven't figured out how to manage a population of educated men and women." Vygotsky is right on board with this approach, writing that

> There is a widespread opinion that creativity is the province of a select few … This is not true. If we understand creativity in its true psychological sense as the creation of something new, then this implies that creation is the province *of everyone to one degree or another*… (2004, p. 33; emphasis added)

The creativity myth that puts some men (indeed, typically white men) high on pedestals—as ostensibly exceptional, extraordinary individuals "out of this world" presumed to possess almost divine qualities and mystical access to some transcendental truths—erects barriers between them and the rest of us while diminishing equality and squashing incentives for innovating, creating and daring. This is an elitist and disempowering approach that belittles the accomplishments that *all* humans can be credited with in their seemingly—only seemingly! - mundane and ordinary lives. Such a challenge to the myths of creativity is not meant to diminish achievements by our predecessors (and contemporaries) or to equalize all accomplishments with no regard to their social significance, beauty, import, and value. Rather, it is meant to call attention to the otherwise overlooked yet truly extraordinary complexity of what we tend to dismiss as the so-called mundane dynamics of the "everyday" and the "ordinary". It is important to *first* emphasize the amazingly creative, transformative agency that *all* human beings share and need to gain sociocultural support for. The next critical step should be about how society provides conditions for and supports creativity in all people, especially those who are historically disadvantaged, or fails to do so in putting limits on creativity, at its own great loss and detriment, as unfortunately happens too often today.

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27

Engineering Creativity in an Age of Artificial Intelligence

Daniel T. Gruner and Mihaly Csikszentmihalyi

Engineering Creativity in an Age of Artificial Intelligence

As the world enters what has been called the fourth industrial revolution—an era dominated by technology, digital media, and now increasingly, by machine learning—a new debate is emerging around capacities for creativity. Are humans the sole sources of creative output? With rising rates of automation, large corporations are fraught with ethical dilemmas associated with introducing machine learning to the workforce.[1, 2] Machines can already engage in many of the mundane tasks that were traditionally assigned to manufacturing sectors of society (Harari, 2016; Susskind & Susskind, 2015). But as algorithms get better at making decisions and solving problems, some of the more

[1] "Ethics of Autonomous Vehicles." Retrieved from MIT Media Lab. https://www.media.mit.edu/projects/ethics-of-autonomous-vehicles/overview/

[2] "If an AI Creates a Work of Art, Who Owns the Rights to It?" In *Quartz*. https://qz.com/1054039/google-deepdream-art-if-an-ai-creates-a-work-of-art-who-owns-the-rights-to-it/

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complex procedures undertaken by professionals are also at risk of being replaced.[3, 4] Professionals must exercise creativity when making critical decisions during moments of uncertainty. Machines are being programmed to skillfully evaluate patterns in their immediate environments and make informed decisions based on predictive analytic models. And these calculations rely on utilitarian heuristics. That is, artificial intelligence in relation to the professions is being built around maximizing "good" for the greatest number of individuals. But who decides what is "good?"

Machines are also being programmed to generate creative works of music, painting, and literature that have traditionally been relegated to eminent (human) creators.[5, 6] As such, we address two flavors of creativity in this chapter that are particularly sensitive to disruption by artificial intelligence. The first encompasses the difficult decisions that professionals must make when they encounter uncertainties. To select an appropriate course of action based on given—and often, limited—information requires creative thinking and acting. This type of creativity aligns with Kaufman and Beghetto's (2009) "Pro-C" creativity; creativity that is deployed within existing domains of knowledge, but is non 'paradigm busting.' And the other kind of creativity highly sensitive to disruption is everyday creativity.

Everyday creativity, or what is known as "*little-c creativity,*" refers to individual capacities for doing things in novel ways. Creativity of the *little-c* variety also presents opportunities for peak human experiences. Beautiful works of art, music, and prose, for example, characterize something unique about the human enterprise. Much of this little-c creativity depends on emotional input, affective co-regulation, and human agency (Baker, Jara-Ettinger, Saxe, & Tenenbaum, 2017). In short, little-c creativity requires complex operations of human consciousness that have not yet been successfully imparted to artificial intelligence systems.

Are we finally reaching an age where machines are learning, thinking, and deciding on their own? Or, is creativity merely engineered according to what society currently values? To answer these questions requires at first an understanding of what creativity is.

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[3] "The Future of Human Work is Imagination, Creativity, and Strategy." In *Harvard Business Review*. https://hbr.org/2018/01/the-future-of-human-work-is-imagination-creativity-and-strategy

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[5] "How Google is Making Music with Artificial Intelligence." In *Science Magazine*. http://www.sciencemag.org/news/2017/08/how-google-making-music-artificial-intelligence

[6] "Artificially Intelligent Painters Invent New Styles of Art." In *New Scientist*. https://www.newscientist.com/article/2139184-artificially-intelligent-painters-invent-new-styles-of-art/

What Is Creativity?

There is a common conception that creative products are unique, original, and novel (Simonton, 2009). Most definitions also require that the novel idea or product be useful (Sternberg, 1988). Still, this definition can be further expanded to include only products that are deemed to be original and useful across generations (Csikszentmihalyi, 1996; Gardner, 1993). Scholars across disparate scientific domains lend their voices to a wide range of definitions including, but not limited to, creative traits, processes, experiences, and behaviors (Cacha, 1976; Furnham, Batey, Anand, & Manfield, 2008; Gopnik, 2009; Lyubomirsky, King, & Diener, 2005). Most of these definitions emerged from creativity research in the western world.

Creativity research in the United States unfolded in three distinct waves following World War II, when behaviorism predominated the field of psychology. The first wave focused on the personalities and dispositions of highly creative individuals. The second wave coincided with the cognitive revolution in psychology and aptly explored the cognitive mechanisms of persons—often military personnel during the War—who were able to respond to difficult situations in unexpected ways. And the third wave of research expanded individualist views of personality and cognition to include a broader sociocultural perspective. The sociocultural approach focused on individuals nested between domains of knowledge and fields of experts (Sawyer, 2012).

Since the 1950s, psychologists sought to capture and distill human creativity from the standpoint of individuals as the principal unit of analysis (Csikszentmihalyi, 1996; Gardner, 1993; Sawyer, 2012). Initial explorations therefore asked: *What* is creativity, and how does it develop? At the time, creativity research examined individuals in specific domains, primarily in the arts and sciences (Kuhn, 1996; Simonton, 2009). However, creativity need not be as epochal as Ghiberti's north door of the Battistero di San Giovanni, Beethoven's *Piano Concerto No.* 5, Picasso's *Guernica*, or as Copernicus' heliocentric model of the universe. Indeed, from a psychological perspective, everyday creativity manifested on a much smaller scale might be a more important phenomenon to understand.

Humans exercise creative practices when interacting with friends, family members, or colleagues. Professionals exercise creativity by making appropriate decisions when information is limited and outcomes are unclear (Gardner & Shulman, 2005; Gardner, 2013). Moreover, humans can solve problems either collaboratively or while working alone. We paint pictures, write short stories, play music, and solve complex puzzles. We may be creative in deciding what to wear, the hobbies we take up, or with the questions we ask during

stimulating conversations. Professionals exercise creativity when presented with unique problems that bubble up in unexpected situations. A surgeon, for example, must at times accommodate new problems *in vivo* during an operation.

Deep learning machine programs are now capable of adapting to unexpected situations. The emergence of self-driving cars might be the most timely example (Lipson & Kurman, 2016), though the 'autocorrect' features on our smartphones also prove useful on a smaller scale. However, unlike human beings, artificial intelligence is programmed to make decisions without affective and cognitive restraints. Some even argue that machines are better poised to maximize positive outcomes because they are bound to precise utilitarian algorithms (Harari, 2016).

Moving forward, we present two key definitions that will help contextualize creativity as both a human enterprise and a salient capacity of artificial intelligence. The first draws on the individualist approach developed during first-wave and second-wave creativity research. As suggested, the individualist approach is concerned with the *individuals* involved in creative processes. The individualist perspective, therefore, principally focuses on the person as a unit of analysis, and forgoes operationalization in terms of external social and cultural forces. According to the individualist definition: "creativity is a new mental combination that is expressed in the world" (Sawyer, 2012, p. 7).

The individualist approach to creativity holds three main assumptions. First, creativity must be something new, unique, or original. Rote memorization of linear mathematical equations, for instance, is not creative, nor is the memorization of facts for multiple-choice exams. However, demonstrating one's understanding of knowledge by crafting new combinations of existing equations, or solving problems by refashioning previously mastered behaviors and ideas can be creative. Importantly, understanding learned material requires application of knowledge to uncharted territories.

The second assumption, therefore, is that creativity involves combinations. Because derived singular thoughts or behaviors cannot be creative in themselves (i.e., violation of assumption 1), previously mastered concepts must be combined in unique ways to be considered creative. The third, and final, assumption of the individualist approach is that creativity must be externalized. To capture creativity in the wild, ideas and thinking patterns must be expressed externally so that they are made visible to the researcher and to the public at large (Sawyer, 2012). Thus, machine learning programs that paint, write, compose music, and play games present welcomed opportunities for measuring the creative potentials of artificial intelligence.

The second definition draws on the sociocultural approach employed by third-wave creativity researchers. It mostly applies to large-scale innovations and innovators that revolutionize entire fields and transcend time. The sociocultural approach addresses what researchers call "*Big-C Creativity*." Big-C creators include the likes of Freud, Einstein, and Picasso, all who were masters in their respective fields. In the sociocultural approach, "creativity is the generation of a product that is judged to be novel and also to be appropriate, useful, or valuable by a suitably knowledgeable social group" (Sawyer, 2012, p. 8). This shift in defining creativity as a function of domains of knowledge and fields of experts introduced a new question: *Where* is creativity? Here, one must ask where 'Big-C' exists within a broader sociocultural system.

The systems model of creativity coined in 1988 by the second author of this chapter (Csikszentmihalyi, 1988) includes three interrelated elements: (1) an accepted and agreed upon *domain* of current knowledge; (2) an *individual* who alters a component of the domain to produce something novel; and (3) a *field* of experts that ultimately decides whether or not the novelty will be accepted into the existing domain. So, in the sociocultural approach, the individual is not the sole component of the creative process. Nor does creativity exist independently in any of these three elements. Rather, creativity (or *Creativity*) depends on individual talent, existing information, and judgment by experts.

Applying the systems model of creativity to artificial intelligence, one might assume that simply replacing the individual with the machine would complete the cycle. However, humans must first impart rule-based algorithms into the machine before the AI is capable of recognizing patterns and generating something unique, novel, and original (let alone something that will be determined to be such an advance that it revolutionizes an entire domain). A reframing of creativity around artificial intelligence therefore requires an additional element in the Big-C model (see Fig. 27.1).

In this new model—which we call *Creativity 4.0*—the individual, or groups of individuals, program AI to perform tasks and process information in specific ways. The field still influences the individual, but does not directly affect the AI. Given that the collective field has no direct influence over the algorithms, but continues to impact decisions made by individuals, we suggest that the field influences AI indirectly through the individual. However, depending on the learning algorithm, AI can draw directly from information it encounters in the domain. As AI improves its predictive capacities and draws on more information from the domain, it begins to make new combinations that are perhaps increasingly independent from the original information provided by individual programmers.

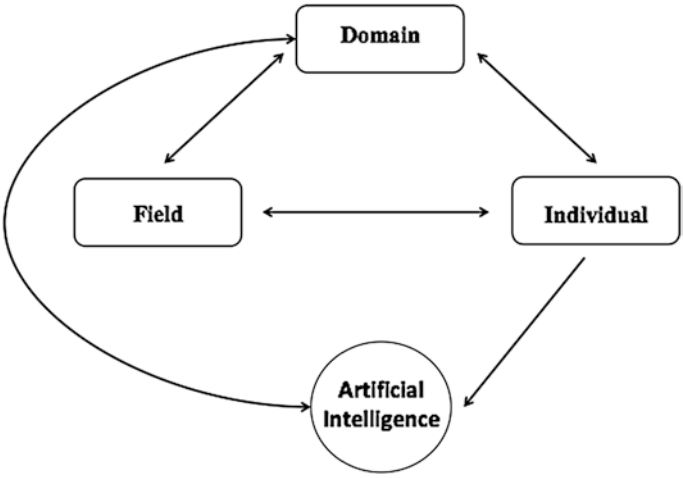

Fig. 27.1 Creativity 4.0—A systems model for fourth wave creativity research. The systems model identifies three elements of Big-C Creativity. In this model, the individual draws on existing information from the domain of current knowledge and uses his or her talents to make something original. A field of experts judges the contribution of the individual, and decides whether or not the new idea will be transferred into the existing domain. Neither element is independent. For instance, the individual is always considering how novelty will be evaluated, and ongoing adjustments to information in the domain are made according to the values of the field. With the added element of Artificial Intelligence, individuals, or groups of individuals, program rule-based algorithms that facilitate computational modeling, pattern recognition, and predictive rendering capabilities. The AI does not receive inputs directly from the field, but it is programmed to adapt to information it encounters from the domain, in turn adding and altering possibilities for new permutations

Some clarifications must be made to further unpack the Big-C paradigm. These modifications are needed because there is some overlap with Big-C and little-c approaches. First, it is assumed that Big-C must be a function of groups. In other words, Big-C researchers explore the collective generation and acceptance of new ideas. This is particularly relevant for organizational behavior, but should also be applied to smaller microsystems and subgroups like classrooms, schools, students, and teachers. For instance, creative educators might introduce a new way of teaching students that disrupts the current pedagogical approach. Similarly, a particularly creative student might leverage her knowledge of other students' interests to foster an immersive classroom climate that increases engagement and learning for everyone in the group. In these ways, the teacher and student described above can make significant impacts on their own microsystems (i.e., the classroom or school).

Another feature of the sociocultural approach is that it does not assume Big-C creativity must resolve extremely difficult problems. We do not wish to suggest that Big-C creativity is reserved only for geniuses. Teachers and students can have large impacts on their immediate ecological systems without necessarily disrupting the field, and hence the domain of learning in which they are operating.

Creativity researchers from diverse fields such as developmental psychology, cognitive neuroscience, sociology, and anthropology align themselves either with the individualist *or* the sociocultural approach. And while neither approach is better than the other, scholars will need to merge these two approaches to generate a more robust portrait of creativity as dispositional, procedural, phenomenological, and sociocultural. Because artificial intelligences, as of now, are not considered conscious entities, we argue that artificial creativity is principally procedural. And while AI programs can elicit wonder, awe, and curiosity in the observer, the machines themselves cannot consciously experience the creative process.

Today, scholars generally refer to the two creativity types already mentioned: *Big-C* creativity and *little-c* creativity. As noted, *little-c* creativity refers to everyday procedures ranging from taking a new route to work, to cooking dinner with different ingredients, or selecting a new outfit for the day. It can also include unique musical compositions or works of art that do not significantly alter the way people view the existing domain. Recent scholarship has included additional creativity types like mini-c, Pro-C, and tiny-c to explain the everyday nuances of modern day human interaction (Gardner & Weinstein, 2018; Kaufman & Beghetto, 2009). And while Big-C is undoubtedly important for large-scale innovations and paradigm shifts, it is the more "mundane" little-c that matters most to developing computer-based algorithms that aim to imitate human thinking patterns. This little-c creativity is typically framed within the context of personality and cognition.

By synthesizing these two approaches (i.e., Big-C and little-c), we suggest that a fourth-wave of creativity research coinciding with the fourth industrial revolution is now appropriately underway (i.e., Creativity 4.0). As artificial intelligence is increasingly generating creative works like paintings, musical scores, and poetry, it seems relevant that we describe how AI organizes and alters information to construct original works. To describe this process, we first contextualize dispositional creativity with a brief discussion of human personality and cognition.

Cognitive Heuristics and Dispositional Approaches

Cognitive psychologists typically describe seven distinct heuristics of creativity that include: (1) problem finding; (2) knowledge acquisition; (3) information collection; (4) incubation; (5) divergent thinking; (6) combination; and (7) convergent thinking. Divergent thinking and convergent thinking are particularly important for creative output and creativity assessments. Creative problem solving would not be possible without first having identified an existing problem space in a specific domain (i.e., problem finding). Once a problem has been identified, individuals must then familiarize themselves with potential solutions. To do this, they acquire knowledge about the problem space. Incubation affords creators time to process that information. When measuring creativity, scholars typically tap divergent thinking strategies. However, most creativity measurements miss the crucial contribution of convergent thinking. As noted above, creativity does not depend exclusively on the identification of ideas. Indeed, categorizing multiple ideas *and* selecting the most appropriate idea from a long list (i.e., convergent thinking) is required to solve problems creatively.

After conducting in depth interviews with eminent creators around the world, Mihaly Csikszentmihalyi (1996) determined that one of the most central personality characteristics of creativity is dialectical thinking. In his research, Csikszentmihalyi found that Nobel laureates, artists, musicians, and CEOs shared an ability to oscillate between polar ends of human experience (e.g., imaginative: realistic; sociable: solitary). Almost all creative exemplars interviewed by Csikszentmihalyi were able to shift between orthogonal properties of these experiences rather easily. This property of dialectical thinking provides initial support for the roles of cognitive flexibility and attention shifting in creative problem solving.

While Csikszentmihalyi's (1996) phenomenological argument for dialectical thinking was devised primarily from qualitative interviews with eminent creators, fMRI studies are providing neurobiological evidence of a two-system structure across three interrelated brain networks that facilitate creative potential in human beings (Beaty, Benedek, Silba, & Schacter, 2016). Research by Roger Beaty and colleagues (2016) implicates two brain networks associated with divergent and convergent thinking patterns, facilitated by a third network that regulates activity between the default neural network and executive areas. Their findings suggest that highly creative individuals display increased functional connectivity between spontaneous (i.e., divergent) and constructive

(i.e., convergent) regions of the brain. Importantly, while neurological evidence supports dialectical thinking (measured by standard divergent thinking tasks), we must also consider the systems point of view given that creativity does not occur in isolation. This is particularly true for programming creativity into AI.

Artificial Intelligence and Creativity

Having foregrounded a few of the cognitive processes of human creativity, we now introduce some of the creative systems emerging in the fourth industrial revolution. Artificial intelligence programs have long been driving forces behind manufacturing sectors of society,[7] so why the recent moral panic in response to "Industry 4.0?" In large part, this concern involves advances in "deep learning."

In contrast to early AI, deep learning technologies afford computers capacities to collate and organize information, but importantly, to also make intelligent predictions about future outcomes using complex probability analyses (Alpaydin, 2016; Murphy, 2012). Like humans, deep learning programs operate with interconnected neural networks that make sense of imputed data. As programmers feed information to these intelligent machines, their encoded neural networks categorize data and generate taxonomies of rendered stimuli. For instance, deep learning networks organize information based on visual, auditory, and alphanumeric symbol structures. They then make predictive calculations from past experiences and generate randomized permutations of existing data points. Through a method of trial and error, deep learning programs make "intelligent guesses" that become increasingly precise with new iterations of probability analyses. Rapid advancements in deep learning systems are pushing Industry 4.0 platforms toward the arena of professional decision-making.

Recent surveys indicate that machine learning programs could replace up to 50% of the human workforce by the year 2055 (Harari, 2016).[8] However, the rate of job displacement by automation depends on the domain of work. As Harari (2016) points out, the prospect of AI outperforming humans in

[7] "Robots Have Been Taking Our Jobs for 50 Years, so Why are we Worried?" Retrieved from *World Economic Forum*. https://www.weforum.org/agenda/2017/07/robots-have-been-taking-our-jobs-for-50-years-so-why-are-we-worried-now/

[8] "Harnessing Automation for a Future that Works." In *Mckinsey Global Institute*. https://www.mckinsey.com/featured-insights/digital-disruption/harnessing-automation-for-a-future-that-works

complicated tasks depends on variations in pattern recognition. Indeed, some domains of work require more sophisticated forms of pattern recognition, and in turn, creativity, than others. Manufacturing jobs and labor-intensive occupations harboring hefty volumes of repetitious tasks will likely be the first to experience severe disruption. But as machine learning becomes increasingly intelligent in shorter periods of time, professions that require complex cognitive and social-emotional skills might soon follow (Harari, 2016).

Advantages of artificial intelligence include capacities to make important decisions without emotional attachment to intended beneficiaries. For instance, a computer program can suggest potentially fatal invasive treatments for terminally ill cancer patients while a self-driving car will be forced to decide whose life is more valuable in the event of an impending collision (e.g., the passengers or the jaywalker). But, as we have already noted, humans must first program the AI sitting behind the proverbial wheel. And it is likely that AI algorithms reflect the interests of programmers. Inevitable questions of human bias therefore bubble up in many of the moral and ethical conversations attributed to machine learning programs and their creative responses to real world dilemmas. While machines are indeed becoming increasingly competent at a variety of tasks, the success of those tasks depends on the ways programmers are instructing them to find and solve problems.

From a utilitarian standpoint, the optimal method of decision-making is the one that yields the most desirable outcome for the largest number of people. Utilitarian heuristics therefore seem most applicable to deep learning programs. In the case of self-driving cars, for example, the machine will be programed to maximize number of lives saved regardless of differential emotion valuation. In contrast to utilitarian heuristics, trained professionals make snap decisions according to variations in context (Gardner & Shulman, 2005). Specifically, humans are genetically hardwired to empathize with others, and certain professions (e.g., medicine and law) permit closer proximity to intended beneficiaries. Of course, affective arousal mechanisms can, and often are, obfuscated so that emotional attachment doesn't cloud professional judgment. These decisions are made under the assumption that professionals undergo extensive training that enables them to apply the most appropriate course of action in any given context, often (hopefully) from a point of disinterestedness.

However, as one might expect, several instances of programmer bias have surfaced in recent years. For example, a group of MIT researchers led by Joy Buolamwini found that facial recognition software was significantly more accurate at identifying the race and gender of white males than non-white

females.[9, 10] Another ethical quandary has appeared in AI risk prediction programs known as "black-box risk scoring."[11] Risk assessment of this variety predicts individuals' chances of being incarcerated, making bail, or securing loans. Studies have shown that algorithms make these risk assessments by considering users' gender, race, and education level (Tan, Caruana, Hooker, & Lou, 2017). Certainly, there is still a long way to go in addressing the issue of programmer bias and maximizing "good" according to user preference.

As consumers, we already rely on a wide range of automated programs to help organize our lives and custom tailor everyday experiences. These programs have become so commonplace that we deploy them almost effortlessly. Some are perhaps more obvious than others. For instance, the word processor we are currently using to write this chapter frequently offers typographical alterations. (Of course, we have the option to override these suggestions according to our own creative, stylistic preference!) Google Maps updates live traffic routes to get us promptly to our desired destination. Spotify, Pandora, and iTunes (among others) provide song and artist recommendations that align with our current tastes. The familiar voices of Apple's Siri and Amazon's Alexa are programmed to learn our most frequent requests, and in turn, quickly find resources to aid us in planning events and making informed decisions about the future. The list of intelligent programs that we use in our daily lives goes on and on: Online search engines estimate our preferred queries by filling in half-typed words, shopping bots guide us towards products they think we might want to purchase, automated customer service programs facilitate expedient returns and exchanges, video streaming platforms like Netflix suggest films that relate to our interests, and so forth.

But perhaps the most invasive of these artificial intelligences—at least from an interactive standpoint—are those of modern day social networking platforms like Facebook and Instagram. Indeed, recent revelations that large-scale political consulting firm Cambridge Analytica harvested the personal data of millions of Facebook users for targeted psychographic profiling tugs at the moral, ethical, and legal sensibilities of countless global citizens.[12] The scandal

[9] "Facial Recognition is Accurate, if You're a White Guy." In *New York Times*. https://www.nytimes.com/2018/02/09/technology/facial-recognition-race-artificial-intelligence.html

[10] "Study Finds Gender and Skin-type Bias in Commercial Artificial-Intelligence Systems." In *MIT News*. http://news.mit.edu/2018/study-finds-gender-skin-type-bias-artificial-intelligence-systems-0212

[11] "New Research Attempts to Solve the Problem of AI Bias in Black Box Algorithms." In *MIT Technology Review*. https://www.technologyreview.com/s/609338/new-research-aims-to-solve-the-problem-of-ai-bias-in-black-box-algorithms/

[12] "How Trump Exploited the Facebook Data of Millions." In *New York Times*, March 17, 2018. https://www.nytimes.com/2018/03/17/us/politics/cambridge-analytica-trump-campaign.html

has even prompted some users to delete their Facebook profiles entirely.[13] It's possible that computers and search engines know us more intimately than our spouses or significant others!

Social media algorithms can tap into our inner most thoughts and desires. Online searches of diagnostic criteria for medical ailments or exploring housing markets and stock exchanges provides useable data to technology conglomerates that then leverage our queries for targeted add campaigns. But this type of pattern recognition is not creative, per se. (Or at least it isn't what we would call Big-C or little-c creativity.)

Although the evolution of automated programs has been shown to increase the efficiency and precision of pedestrian tasks, the more complex forms of pattern recognition associated with creative combinatorial processes are still quite nascent (though rapidly evolving). Importantly, the mundane tasks of automated programs will perhaps one day replace many "higher level" jobs, but do not yet fulfill the more creative endeavors for which machine learning has potential.

Technologists are currently beta testing computer programs that use deep learning platforms to outperform humans in more creative ventures than mere assembly lines and Netflix recommendations (Harari, 2016). Machines can already best human players at games like chess,[14] and even "learn" to create digital works of art,[15] improvise with a variety of musical instruments, and diagnose cancer (Bahl et al., 2018).[16] One of the most profound little-c learning algorithms in development is a program called Google Deep Dream. Deep Dream generates paintings "independently" by codifying digital images and applying pre-identified parameters to create novel works of art. In short, digital image inputs coupled with sequential processing algorithms provide a foundation for Deep Dream to engage in predictive rendering. The results are an unusual mix of images that resemble what one might describe as nightmarish dreamscapes. Deep Dream encodes user-provided digital images and interprets them by using permutations of previously stored data in its neural network.

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[13] "For Many Facebook Users, a 'Last Straw' that Led Them to Quit." In New York Times. https://www.nytimes.com/2018/03/21/technology/users-abandon-facebook.html

[14] "How the Chess Was Won." In *MIT Technology Review*, August 1, 1997. https://www.technologyreview.com/s/400089/how-the-chess-was-won/

[15] Google Deep Dream Generator. https://deepdreamgenerator.com

[16] "Using Artificial Intelligence to Improve Early Breast Cancer Detection." In *MIT News*, October 16, 2017. http://news.mit.edu/2017/artificial-intelligence-early-breast-cancer-detection-1017

Yet, even with all these advances, sophisticated machine learning programs that can predict specified outputs and render creative compositions are inexorably dependent on input from human minds. For a machine to create a painting, it must first be shown existing images; to recommend an appropriate fashion ensemble, it must first be given options from which to choose; and to 'compose' an original score, it must be programmed to recognize and understand synchronous harmonies and patterns in notes. In short, AI is fed information from an existing knowledge base. One might ask: Isn't this exactly how the individual operates in the larger system, by drawing on existing information in a domain of knowledge?

Perhaps, and in some ways, yes. But it is crucial to recognize that human programmers selectively apply this information. Thus, human agency is exchanged for prescribed automaticity. The computer program cannot think for its own, even if it is programmed to deploy randomized outputs from pre-programmed inputs, because the inputs are purposefully selected. In the world of human intelligence, the domain is an open system. It is an evolving organism of cultural values and memes forged collectively by the inhabitants of society. In contrast, the domain of the machine world is a closed system. The only experiences allowed entry are those that are programmed into it. In short, the artificial domain is created from the limitations of the human mind; and any further iteration is dependent on the inputs of human creators.

Following this argument, AI engines are (as of now) incapable of radically altering existing paradigms independently. In other words, while Deep Dream indeed presents noteworthy and admirable artworks, they pale in comparison to the lasting innovations of a Da Vinci, Ghiberti, or Picasso. Of course, beauty lies in the eye of the beholder, and this is our own artistic bias bleeding onto the words of this page. To better understand why AI and machine learning have not yet earned their place among the pantheons of indisputable creators requires the consultation of the field within the systems model of creativity.

Conclusion

While scholars have been exploring human creativity since the middle of the twentieth century, emerging work in artificial intelligence and deep learning is proving to be an exciting, yet vexed, area of research and application. Indeed, some worry that machine learning programs might

disrupt a variety of professions that require high levels of human affect and cognition. Human creativity is rooted in an array of social, emotional, and cognitive mechanisms. Affective arousal, attention shifting, and cognitive flexibility facilitate problem finding, divergent thinking, incubation, and convergent thinking patterns. In turn, creativity can be observed as an individual process or nested within broader sociocultural systems. Thus, the capacity to adapt to novel situations is a critical, and unique, component of human beings that artificial intelligence has yet to fully replicate.

Technologies that aided human survival from the agricultural to the industrial revolutions served the purpose of making life more comfortable. These technologies freed physical and cognitive resources that were once relegated to fulfilling basic needs. Our hardwired survival instincts shifted dramatically when we transitioned from nomadic lifestyles to agricultural settlements—a welcomed departure from hunting, gathering, and storing resources for day-to-day survival. When humans learned to leverage natural resources in favor of managing crops and livestock, a sizeable sum of energy was spared; emotional, cognitive, and physical resources could be spent on other worthwhile pursuits.

Now, in what some are calling the fourth industrial revolution, machine learning programs still serve the intended purpose of making our lives easier; from predictive algorithms that can efficiently diagnose a variety of diseases, to the more mundane tasks of navigation, music recommendation, and spell checking. AI is designed to reduce our cognitive load by making decisions for us. At the same time, our intrinsic curiosities to push the limits of artificial capabilities provide avenues for designing programs that paint, compose, and play.

In an era where robots learn to perform—indeed, outperform—certain human tasks, some wonder whether machines can iterate new forms of thought and recognize complex patterns better than we can. Yet, the absence of emotional arousal systems removes an important relational component that humans need for generating creative (and useful) ideas. An intelligent algorithm that accurately perceives, understands, and regulates emotions, to our knowledge, has not been fully developed. In sum, while Harari (2016) claims "the idea that humans will always have a unique ability beyond the reach of non-conscious algorithms is just wishful thinking" (p. 319), we suggest that the capacity for moral and emotional reasoning beyond utilitarianism is something, that at least for now, cannot be replicated even by complex machine learning algorithms.

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Life in the Cyber-Physical Society: The Need for Organic Creativity

Giovanni Emanuele Corazza

Being Human in a Cyber-Physical World

While the human species is transforming the world with its own hands, without any apparent necessity for reflection, we are ourselves uncertain about the characteristics of the future society and what will it mean to live a satisfying and happy life in a few decades from today. Interestingly, this feeling of uncertainty is certainly neither new nor recent: it derives as a negative consequence of our intrinsic ability to anticipate the future (Corazza, 2017a; Poli, 2010), and it appeared prominently in the writings of the classics; for example, in the famous *carpe diem* by Horace: "*Confine your hopes to a short space. While we talk, envious time has been flying. Seize today, trust as little as possible to the morrow*". Anticipation of what is going to happen next is a double-edged sword: it is a wonderful ability which serves to regulate our decisions and our emotional status, as well as enable our planning, but it can also be a source of anxiety when the contours of our predictions are less than well defined. Clearly, anticipation becomes more and more difficult in the presence of a constantly growing acceleration, as well described by Rosa (2003, p. 3): "[…] the history of modernity seems to be characterized by a wide-ranging speed-up of all kinds of technological, economic, social, and cultural processes and by a picking up of the general pace of life". However, in spite of all uncertainties hardly anyone would

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argue against the statement that, whatever the future will look like in the developed side of the world, it will certainly be characterized by the pervasive presence of cyber-systems, artificial intelligent agents, distributed technological infrastructures, and myriads of interconnected devices (Brynjolfsson & McAfee, 2014; Corazza, Pedone, & Vanelli-Coralli, 2010): we can label this techno-environment as the *cyber-physical world*, and the consequent organization of our lives in distributed communities as the *post-information society*. The impact of this transition on our lives and on our balance in society is bound to be very significant, at all levels. It would be important to take time for reflection, and for confronting ourselves with both proximal and ultimate questions (Alessi, 1992).

Why is the human species developing in this direction? How are we reacting to these transformations? How are we preparing the next generations for the future through our educational systems? How will economy and the job market be affected? What will determine our well-being, when we have a prospect for physical lives that might last much longer than our natural predispositions would allow? Why are we confusing tools for goals? These questions are far from trivial, and we intend to address them only in part in this work; yet, our conclusions are sufficiently precise to indicate one possible route for the scientific research of today in the area of social creativity.

Digital Skills: The Rise of Computational Thinking

Let's start by observing the most common reactions that are rising at governmental level when confronted with the epistemological implications of the cyber-physical world in the post-information society. Typically, the problem is felt to be first and foremost of educational nature: should we introduce new subjects, should we change the way we teach traditional subjects. The main driver behind these arguments is that the world is more and more dominated by technology, and as such the understanding of our environment becomes almost impossible if one is not technology-savvy. There is actually a sort of irony that appears when one realizes that in the current historical era younger generations are digital natives, but the educational programs are being reformed by adults who are, in general, digital late-adopters, with exceptions for those living inside or in the vicinity of the world of engineers (who are typically not involved in educational sciences, however). Indeed, when we compare digital natives and the elderly, we see a reversed form of knowledge gap: the young should teach the old, and quite often they do. This reversal of roles is in itself a social problem, especially realizing that life expectancy is increasing, and the

elderly segment is forecast to grow percentage-wise, at least in the European ageing society (Lutz, O'Neill, & Scherbov, 2003). It could rightly be argued that an educational reform for digital natives should be driven by digital natives themselves: if only they had the capacity to design it! At any rate, the proper design of a new schooling system should account for the impact of technology on the cognitive, emotional, and social characteristics of the younger generations, which of course would in turn require important efforts in terms of scientific research in related psychological sciences. This hardly appears to be the case in European funded research initiatives. An example of such enquiries has been given by Loh and Kanai (2016), who stated that (p. 1): "[…] cognitive processes and their underlying anatomical structures are highly plastic to both behavioral and environmental changes throughout our lives. […] With enduring alterations to our behaviors and environments, technological inventions can profoundly affect our highly plastic cognitive system." Loh and Kanai then go on to analyze cognitive effects of hypertext environments, online access to information, Internet-related multitasking, producing increased distractibility, altered reward-processing and self-control in Internet-related addictions, as well as the neural correlates of all the above behaviors. In general, there appears to be an evolution towards a shallow mode of learning, characterized by quick scanning, reduced reflexivity and memory consolidation. On the other hand, these effects can well be understood in a framework of minds that can instantaneously access all the distributed databases of the world to address any question, or at least those that requiring pure information retrieval. One could draw a similarity with the effects that the introduction of cars had on our abilities for long walks, or for riding horses. Still, we all move much faster now: one can consider this a progress in transportation for the human species.

We should therefore consider if it is really true that the advent of technology, and computers in particular, has only negative effects on the minds of the younger generations, both in cognitive and in social terms. More likely, there exist both positive and negative sides. Let's turn our attention to the seminal and truly anticipatory work of Seymour Papert (1980), who discussed pre-Internet interactions of children with computers, in particular programming experiences with the LOGO language, even at pre-school ages. These interesting considerations can today be considered as pre-historic fragments of the Information Society. Citing from Papert (1980, p. 19):

> "[…] in teaching the computer how to think, children embark on an exploration about how they themselves think. The experience can be heady: thinking about thinking can turn the child into an epistemologist, an experience not shared by most adults." Reading further (p. 21):

> "Seen in this light, [the computer] is not just another powerful educational tool. It is unique in providing us with the means for addressing what Piaget and many others see as the obstacle which is overcome in the passage from child to adult thinking. I believe it can allow to shift the boundary separating concrete and formal. […] Two kinds of thinking Piaget associates with the formal stage of intellectual development: combinatorial thinking, where one has to reason in terms of the set of all possible states of a system, and self-referential thinking about thinking itself."

Papert's lessons rested in good peace, essentially forgotten, for more than two decades, until Jeannette M. Wing came to introduce the notion of *computational thinking* (Wing, 2006, 2008). In her papers, she defines in rather general terms what is entailed by the thinking style of a computer scientist, intended as any thinking agent controlling another agent, one capable of "computing" in the most general sense. The former agent would normally be a human and the latter a computer, but they could as well be two humans, two interconnected computers, or in a (perhaps not too far) future, an artificially intelligent agent teaching or interacting with a human. Computational thinking involves a series of abilities which are not the typical ones trained in our schools, or at least not explicitly: abstracting, decomposing and modularizing, thinking recursively, thinking in algorithmic terms, parallel processing of information, prefetching and caching in anticipation of future use. Computational thinking can exploit massive amounts of data through machine learning algorithms, to extract data-driven inferences that can help humans in making decisions. Jeannette M. Wing (2006) underlines the fact that computational thinking is a modality according to which humans, and not computers, think: it is a way for humans to solve problems by exploiting a computer, and it is not trying to get humans to think like computers. Wing (2008, pp. 3720–3724) proceeds to outline two visions and two challenges, which we report here:

Vision 1:	"I envision that computational thinking will be instrumental to new discovery and innovation in all fields of endeavor."
Vision 2:	"I envision that computational thinking will be an integral part of childhood education."
Challenge 1:	"What are effective ways of learning (teaching) computational thinking by (to) children?"
Challenge 2:	"How do we make our technology and the wealth of our applications accessible to all? How do we balance openness with privacy?"

We can safely state that, following these contributions by Jeannette M. Wing, the domain of computational thinking was officially opened, and since then a wealth of contributions have been provided (see Lockwood & Mooney, 2017, and the references therein), initiatives for K-12 children have been implemented (Barr & Stephenson, 2011; Lu & Fletcher, 2009), as well as mentions of computational thinking in school reforms (e.g., see the Italian "Piano Nazionale per la Scuola Digitale", or the Canadian C21 Program for 21st Century Learning and Innovation).

All of this intellectual movement in favor of the development of digital skills is certainly useful and necessary, but two elements are worrisome: first, this melody is primarily being played by information scientists, and not by educational scientists nor educational psychologists. Second, and more important to our discussion here, a confusion is growing around the idea that computational thinking is also a recipe to grow creative thinking. While, on the one hand, it is true that, by exploiting computational thinking skills to implement algorithms on a computer, one can take advantage of all the intangible and tangible opportunities of creating digital artifacts; on the other hand, it should be extremely clear that creative thinking is a totally separate set of skills, both at individual and at social levels. Unfortunately, this distinction does not appear to be generally clear, as one could see for example in the contribution by Mishra, Yadav and Deep-Play Research Group (2013), where one can read (p. 11):

> Recently, computer science educators have underscored the importance of creativity by incorporating creative processes as one of the big ideas of computer science. […] Computational thinking can foster creativity by allowing students not only to be consumers of technology, but also build tools that can have a significant impact on society.

They proceed in the description of two examples, one on musical composition and one on the design of a modified car logo, to conclude that (p. 13):

> In each of these cases, human creativity is augmented by computational thinking, in particular the automation of problem solving and algorithmic thinking. Computational thinking allows each individual to become more creative and productive. None of this is possible, however, without the designer or composer having computational thinking skills.

The final sentence sums up the bewilderment: in order to be creative and exploit computer aided instruments, one should have been trained in

computational thinking. This is clearly not necessary (if not completely wrong) for at least two reasons: (i) human-computer interfaces are being purposely designed to be as user-friendly and natural as possible, so that one will be able to interact with a computer without having any idea of the underlying complexity and actual algorithms that are running behind the curtain; (ii) social elements can and should come in, so that creative collaboration exploiting new technologies can possibly be carried out through the mutual interaction of "creatives" and "computer scientists" (both intended in the most general way). Therefore, we are not denying that such collaboration will indeed be fundamental, and that both abilities should be usefully developed: but this does not allow any confusion between the two separate sets of characteristics, skills, training approaches and social situations that are potentially favorable for creative thinking on one side, and for computational thinking on the other.

Indeed, to improve the future collaboration between man and machine, both in terms of productivity and well-being, we must concentrate a good part of our efforts on making the human more human, and not at all similar to a computer. Only in this way will we preserve the uniqueness of the human species. And in this sense, the development of *organic creativity* should be considered to be an irreplaceable and constituent element of the education of future generations.

Organic Creativity

As discussed in (Corazza, 2017b, p. 601), organic creativity can be defined as the *potential for originality and effectiveness conducive to personal and social well-being*. This connotation builds upon the dynamic definition of creativity as the potential for originality and effectiveness (Corazza, 2016) by adding the fundamental requirement of generating both personal and social well-being for the human species. Organic creativity is a form of happiness joint with both freedom and productive behavior for human beings, who are meant to be well inserted into the structure of the Post-Information Society. Clearly, organic creativity should be considered to live at the opposite end of the spectrum with respect to what can be identified as the dark side of creativity (Cropley, Cropley, Kaufman, & Runco, 2010). In this sense, organic creativity should also be intended as an ethical value, contributing to growth and pro-social purposes. Let's analyze in some depth the above definition to highlight why and how this behavior is only human, and how creative thinking is definitely complementary to computational thinking.

While effectiveness is domain-dependent, and it is certainly also a goal for both a computational thinker and a computer, originality is a creativity-specific meta-attribute, subsuming three independent dimensions: novelty, surprise, and authenticity (Corazza, 2016). Surprise is an emotional response, implying the temporary violation of the expectations residing in our social and cultural environment. Without surprise, novelty is reduced to a predictable incremental evolution of the current state-of-the-art. Important, necessary, but essentially boring. The willingness to produce surprise, the associated self-belief and risk-taking attitude, and the persistence which is necessary to face the natural world's resistance, these are all human characteristics that depend on personality traits, cognitive and emotional abilities, and very importantly on the social and cultural environment in which the creative process is embedded (Glăveanu, 2011). On the other hand, authenticity is another essential ingredient of originality: it is the signature of the person(s) and the process who generated the creative outcome. Authenticity carries the traces of a human story, developed through a history and within a culture. It is a fact that several research groups around the world are working to develop "computational creativity" (see Colton, de Mántaras, & Stock, 2009, and the references therein), but while artificial composers, writers, or painters can produce novelty that at times can be surprising, the authenticity of artificial products is, and will always remain, questionable. One could in fact argue that the authenticity of artificial creative outcomes, if at all present, will always reside on the human side through cyber-physical collaborations. As such, the mindsets and abilities leading to surprising and authentic creative behavior should be developed as a pure complement to the sole efficiency of computational thinking.

Let's now turn our attention to the fundamental keyword in the dynamic definition of creativity: *potential*. Indeed, one cannot circumscribe creativity only to those instances in which originality and effectiveness are manifest, and this for two reasons. First, the search for creative outcomes is more similar to a vast exploratory search than to a shooting for a precise target. One must account for long periods of creative inconclusiveness along with a few creative achievements: but as long as the potential is cultivated, it is always the creativity game one is playing (and playing is in itself an important word, here). Strangely enough, but only at first, creative potential is increased by allowing elements of information into the process which a-priori appear to be irrelevant (Agnoli, Franchin, Rubaltelli, & Corazza, 2015). This attitude, strongly related to openness of mind, is absolutely forbidden in a computational thinking exercise. Second, the fact that a potential is turned into an achievement through a positive assessment of outcomes is actually a social process,

depending upon subjectivity, persuasion, time epoch, social and cultural elements. Assessment should be intended as *estimation*: in order to see the full value of a creative product, one should be able and invest the resources to consider all possible environments, all possible uses, all possible aesthetic metrics against which the product itself can be projected. As a consequence, the estimation of a creative product is a creative effort in itself, requiring imagination, anticipation, sensibility, and emotional intelligence. It is a never-ending exercise that only humans can truly engage in. And personal and social well-being can indeed come through the ability to extract all possible value from the different perspectives, actions, and contributions that every agent is providing at any time instant, thus contributing to confirming the role of creativity as the ultimate metaphysical principle in our universe (Whitehead, 1978/1929).

Therefore, while computational thinking and computational resources can indeed be useful in the exploratory and combinatorial parts of the creative process, we must continue to cultivate and preserve the human abilities that are necessary for risk taking, resilience to frustration, as well as for the estimation of originality and effectiveness across time and cultures, thus enabling the well-being that descends from turning creative potential into creative achievement. Computational thinking will never be sufficient to produce psychological and social well-being for humans. This is the essence of the development of organic creativity interventions at both psychological and social levels. Indeed, an ambitious and stimulating challenge for the positive future of our species.

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29

From Static to Dynamic: Toward a Socio-dynamic Perspective on Creativity in Classrooms

Ronald A. Beghetto

Classroom settings represent promising sites for studying the social aspects of creative expression. This is because classrooms are relatively well-defined settings that are shot through with opportunities for creative expression (Beghetto, in press-a). Conducting creativity research in classrooms, however, is challenging. This challenge stems from the recognition that classrooms are complex social settings (Doyle, 2006).

One way that I, and other, creativity researches have typically responded to this challenge is to reduce the complexity of classrooms by using static and somewhat decontextualized approaches (e.g., surveys, tests, checklists, expert ratings) in an effort to isolate and examine specific features of creative students and teachers (e.g., divergent thinking, personality traits, self-beliefs, motivational beliefs, student and instructional behaviors). Consequently, we have tended to privilege more static and individualized conceptions of creative expression over and against more dynamic and social perspectives.

In this reflection, I highlight a more socio-dynamic account of creative expression in classrooms. My aim is to offer a more balanced perspective that attempts to maintain a productive tension between more individualistic and social-process accounts of creativity.

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Toward a More Socio-dynamic Approach

How might researchers take a step toward a socio-dynamic approach? One way is to seek a better balance between individualistic and social conceptions of creative expression. Figure 29.1 provides a visual representation of this aspirational balance.

As illustrated in Fig. 29.1, a narrowly individualistic approach tends to ignore the socio-dynamic context by *zooming in* on intra-psychological features of creativity. Such an approach treats creativity as a somewhat fixed entity that dwells in varying degrees in the minds of people. The aim of creativity researchers, from this perspective, would be to locate, measure, and attempt to explain variations in creativity across different people. As a result, the more dynamic, social, and situational features of settings in which creative expression occurs would be ignored or treated as statistical noise.

Alternatively, an overly social perspective blurs the unique contributions and individual differences of people by *zooming out* and focusing on the extra-individual creative processes that produce creative outcomes. In such an approach, creativity represents an extra-individual process or set of generic techniques that result in creative outcomes. The goal of researchers, from this perspective, would be to identify the creative strategies or steps that can produce creative outcomes. Consequently, the unique contributions of particular individuals or the dynamic features of a particular situation that impinge on the process would be blurred or overlooked.

In both cases, important aspects of the socio-dynamic context are stripped away and result in fragmented and confounded accounts of creative thought and action: *This* creative student produced *that* creative artifact, *this* generic creative process yielded *that* creative outcome. Such "creativity begets

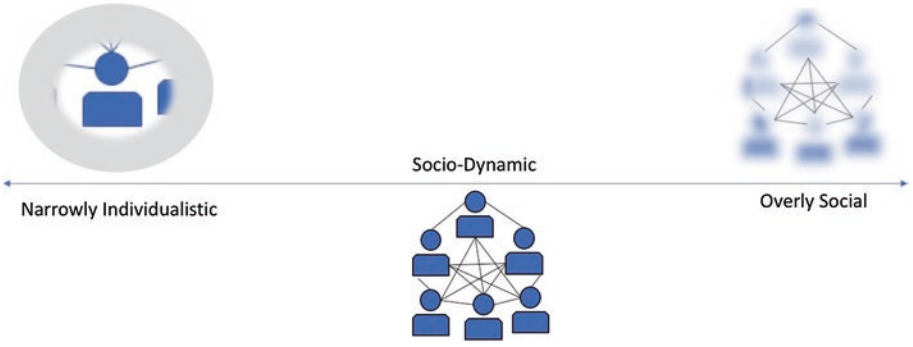

Fig. 29.1 Striking a socio-dynamic balance

creativity" accounts portray creativity as a tautological entity that reproduces itself through particular types of people, processes, or products. This kind of circular logic severely impedes research aimed at developing a better understanding of the social and dynamic features of creative thought and action.

In what follows I sketch out a few key assumptions of a socio-dynamic perspective on creativity in classrooms. I then close with a brief discussion of future directions for theory and research.

Creative Expression in Classrooms

As I have discussed elsewhere (Beghetto, in press-a), classroom environments are unique social settings (Doyle, 2006; Jackson, 1990). They are designed to house a relatively large group of people in a small space for a long duration of time (NCES, 2013). These settings present numerous socio-dynamic possibilities. At any given moment in a classroom, there is a staggering number of unique, person to person interactions possible.

Classrooms also tend to be highly structured and goal directed environments. They are well defined settings with pre-determined roles, routines, procedures, and outcomes (Jackson, 1990). Classrooms therefore have a Janusian aspect to them. One face of the classroom portrays a highly planned and well-defined behavior setting designed around principles of sameness (Glăveanu & Beghetto, 2016); which, at turns, reveals a seemingly contrasting face that portrays a surprising level of unpredictability (Doyle, 2006).

The opposing faces of the classroom can come together in the form of ruptures in the expected experiences and planned activities of the classroom (Beghetto, 2016). These ruptures can emerge from various sources (e.g., a surprising response of a student, a teacher's decision to explore an unplanned aspect of an activity, or any unexpected event that moves the planned trajectory of a lesson in a new direction). Indeed, no matter how carefully a teacher plans a lesson or activity, there is always some unanticipated aspect that emerges from the curriculum-as-lived (Aoki, 2015).

Uncertainty as a Stimulus for Creative Action

The uncertainty that results from the unexpected moments of planned curricular experiences can serve as opportunities for creative expression. When habitual ways of responding or reasoning are no longer viable, people

experience a state of uncertainty (Anderson, 1988; Peirce, 1931–1935). In order to work through this uncertainty, new ways of engaging with the situation, experience, or event are necessary.

In this way, uncertain situations serve as a stimulus for creative expression, because they require people to generate new possibilities that can reasonably resolve the uncertainty they are facing (Anderson, 1988; Beghetto, in press-b). In classroom settings, uncertainty can take at least one of two forms: *encountered* or *induced* uncertainty.

Encountered Versus Induced Uncertainty In the context of the classroom, encountered uncertainty refers to the uncertainty that emerges unexpectedly. These are the surprising moments or ruptures that occur in the planned curriculum (Aoki, 2004). Specifically, encountered uncertainty includes unexpected moments that come from any surprising event or experience that interrupts the planned activity or lesson. As I have discussed elsewhere (Beghetto, 2016), these ruptures can include everything from unexpected individual reactions (e.g., thoughts, emotions, and behaviors) to surprising features of the social and material environment (e.g., the technology used in a lesson stops working, a group of students take the lesson in an unexpected direction).

Responding to encountered uncertainty can result in creative outcomes. Capitalizing on such opportunities, however, presents a challenge for teachers who feel pressured to cover a pre-determined course of action during the limited amount of time they have allotted to do so. Consequently, it is often difficult for teachers to be willing to change their lessons midstream and explore alternative trajectories in their planned lessons (Clark & Yinger, 1977).

Induced uncertainty pertains to teachers' intentional efforts to establish openings in existing activities and assignments. The benefit of induced uncertainty is that teachers can provide planned opportunities for creative expression in a well-defined and instructionally supportive environment. This blend between establishing intentional openings, while still providing instructional supports enables teachers to productively leverage the always and ever present Janusian tension in classrooms.

An example of induced uncertainty is called *lesson unplanning* (Beghetto, 2017a). Lesson unplanning involves replacing pre-determined features of an activity or assignment with to-be-determined features. Planned lessons typically have predetermined criteria and specify what students are asked to do, how they are asked to do it, and what the result will be (Beghetto, in-press-c).

Teachers can "unplan" some aspect of a pre-planned lesson by inviting students to come up with their own problems to solve, their own way of doing something, or generating their own unique products. Again, this occurs in a context of instructional support and clear guidelines. Working together teachers and students can use lesson unplanning to design structured experiences with uncertainty that range from small scale in-class activities to large scale projects.

A small-scale example would be a middle school science teacher who, after teaching about genetic mutations, requires her students to explain a set of predetermined examples using the recently taught explanation. The teacher could unplan an aspect of this activity by having students come up with their own examples of genetic mutations using real or fictitious organism. She could then have students share their examples with each other, receive feedback, and make further revisions and modifications to their examples.

Researchers interested in studying the creative expression in such an instance, would benefit from considering both the individual differences (e.g., beliefs, emotions, types of ideas shared) involved in such an activity, but also how the more social and dynamic features of this particular activity influence and are influenced by students' and teachers' experiences and interactions (e.g., how social and situational features of the task impact, modify, and transform the kinds of examples that students generate).

A larger scale effort would be a project that invites students to identify a complex problem they want to solve in their school or community and then work with others to develop a sustainable solution to that problem. As will discussed in the following section, larger scale creative endeavors effectively illustrate the socio-dynamic features of creativity and provide researchers with opportunities to study these features in a more extended creative effort.

Legacy Challenges: A Larger Scale Example of Socio-dynamic Creativity Teachers and students can work together to design larger scale curricular experiences that provide multiple and prolonged opportunities for creative expression. *Legacy challenges* represent one example. As I've detailed elsewhere (Beghetto, in-press-c), legacy challenges require students to respond to uncertainty by designing and implementing a social project aimed at addressing a problem that impacts students' lives, schools, and communities. These projects foreground student agency by inviting students to design a project that is driven by their social interests and concerns. These projects also illustrate the socio-dynamic features of creative endeavors.

The role of the teacher is to provide students with a structured opportunity to define and address problems that matter to them and people in their schools, communities, and beyond. The problems can range from issues faced by young people in school (e.g., food waste during lunch) to larger community and societal issues (e.g., social isolation of elderly members of their community).

Once students have identified a problem, they are expected to clarify why this problem matters, who they would be helping if they address this problem, and what might happen if they do not address it. In order to clarify why the problem matters, students need to seek out the perspectives of others, including those who might be directly impacted by the problem.

Discussing the problem with people outside of the classroom helps students view the problem from different positions and perspectives (Gillespie & Martin, 2014) and consider new viewpoints about the problem, including exploring whether there are different or more fundamental problems or issues at play. Once students have identified a problem and clarified why it matters, they can then start working with external partners to generate potential ideas for how they might address the problem. Again, this requires testing their own assumptions, seeking out alternative perspectives, and taking steps to implement their solutions.

When engaging in such work, students likely will come to realize that problems and potential solutions can take on a life of their own, leading them in unexpected and emergent directions. By encouraging students to document the story behind their ideas (Clapp, 2016) they can develop a deeper understanding of the socio-dynamic nature of creative work and also increase the chances that they will learn from the process (no matter what the outcome).

Legacy challenges have an on-going component that requires students to think about how they might ensure that the work carries on even after they move on to their next project or grade level. Students are invited, from the outset, to consider how they will make a lasting contribution. This requires students to establish partnerships with other people (e.g., community members, incoming classes of students) who can carry the work forward.

A project developed by a group of high school seniors could, for example, involve bringing in junior students who will continue the work. A group of elementary students who develop a recycling program, might work with their city to establish a partnership to ensure that the city carries their project forward. In this way, students can learn that creative efforts do not necessarily have a final state, but can continually grow and change (Corazza, 2016).

In sum, legacy challenges represent a dynamic, social endeavor that requires students to creatively respond to uncertainty by addressing a problem, in collaboration with external partners and experts, and make a social contribution to their school or community. Legacy projects also require students to display and document their efforts, so they can receive feedback as well as reflect on the behind-the-scenes stories of their work (Beghetto, in press-c). By exhibiting their work, students can also share their efforts with anyone interested in learning from, replicating, or building on their efforts. In this way, such projects are designed to be participatory (see also Clapp, 2017; Hanchett Hansen, in press) and ongoing.

In addition to providing students with an opportunity to respond creatively to uncertainty, legacy challenges also offer creativity researchers opportunities to develop a deeper understanding of the socio-dynamic nature of creative expression. Indeed, creativity researchers can design studies aimed at exploring the social processes and outcomes of students' efforts, including exploring the dynamic interplay among the various individual contributions of this larger social endeavor. Researchers can also trace the dynamic trajectories of how ideas develop, change, and take form into creative actions and outcomes (see also Gajda, Beghetto, & Karwowski, 2017; Tanggaard & Beghetto, 2015), which includes exploring how creative outcomes and actions change over time, across different groups of people, and in different settings.

Dialogical and Developmental

Creative endeavors are both dialogical and developmental (Glăveanu, 2013a; b). Such endeavors are not the sum of solitary individual efforts or perspectives, but rather a dialogical give-and-take among different perspectives of all key actors involved in the situation, including the inner-dialogical interlocutors participants bring into that situation (Beghetto, 2016). In this way, creative engagement with uncertainty occurs *in medias res* (Anderson, 1987), that is: in the midst of the socio-dynamic interplay of perspectives, people, histories, actions, and situations.

The dialogic aspect of creativity underscores the dynamic and developmental nature of creative phenomena (Corraza, 2016). Indeed, creative ideas and artifacts that result from engaging with uncertainty do not appear fully rendered. Rather, creative outcomes have an emergent and unpredictable nature to them. Creative expression, therefore, represents a developmental teleology (Anderson, 1987), which becomes increasingly more defined through engagement with the different people, perspectives and situations at hand.

This to-be-determined nature of creatively responding to uncertainty (Beghetto, in press-c) squares with what others have described as the "blindness" of creativity (Simonton, 2016) or the emergent nature of creativity (Sawyer, 2012). Indeed, there is always some element of surprise in creative expression, which cannot be fully predicted in advance. Moreover, given the dynamic and dialogical nature of creative endeavors, the resolution of uncertainty is perhaps best described as *indefinitely resolved* (see Beghetto, in press-b; Corraza, 2016).

In the example of a legacy challenge, for instance, students, educators, and external partners work together to explore the uncertainty they face, generate possibilities for action, and test the viability of those possibilities. What students learn from those efforts can propel them forward or move them back through previous actions. The dialogical and developmental work continues even when they converge on a reasonable resolution of the issue or challenge. Efforts to implement and sustain creative projects raise ever new uncertainties for students to work through. In this way, creative endeavors (such as legacy challenges) can be thought of as *never ending projects* (Beghetto, in press-c).

Situationally and Retrospectively Determined

Creatively resolving uncertainty, in the context of activities like legacy projects, can take various forms (e.g., a fresh way of seeing a situation, a different way of understanding something, a new way of doing things, producing something new, and so on). As has been discussed, the response is focused on the particular problem, situation, or task at hand. Consequently, the determination of whether a *particular* response would be considered creative can be guided by the typical criteria of standard definitions of creativity (i.e., some blend of originality and effectively meeting task constraints, see Plucker, Beghetto, & Dow, 2004; Kaufman, 2016; Runco & Jaeger, 2012).

Importantly, however, this determination need not be bestowed on the processes and outcomes by creativity researchers; rather, participants engaged in the situation or setting can render this judgment (Clapp, 2017; Hanchett Hansen, in press). Consequently, what counts as a creative response in resolving the uncertainty of a particular educational challenge or social issue represents a combination of individual and collective judgment.

This is not to say that there will be consensus amongst participants in rendering such judgments or that there is no value in considering alternative responses and external evaluations of the merit of specific responses. Rather, determinations about creative outcomes occur retrospectively.

People bestow this distinction on novel ideas, actions, processes, or products *after* they determine that the uncertainty they face has been reasonably resolved (Anderson, 1987; Beghetto, in press-b).

As discussed, however, the dialogical and developmental nature of creative responses to uncertainty make the resolution of uncertainty indefinite and inconclusive (Corazza, 2016). Indeed, productive tensions remain active in the ever-present differences amongst students and teachers (Glăveanu & Beghetto, 2016), which can later result in new and different interpretations.

A student's idea about how to organize class discussions, which was dismissed as unnecessary two weeks ago can later be revisited and recognize by the teacher as a novel and effective way of promoting student engagement in the context of discussing a particularly difficult topic. Similarly, what was once viewed as a creative approach for teaching a particularly challenging concept can later lose its relevance in light of the changing social-dynamics of a new situation or a new set of participants in that situation.

Conclusions and Future Directions

The socio-dynamic account of creative expression in classrooms described herein can help address problematic portrayals of creative phenomena as static (i.e., once a creative solution always a creative solution), de-contextualized (i.e., this creative instructional strategy promises creative outcomes regardless of the people, situations, or tasks at hand), and binary (i.e., this is a creative group of students and that group of students is not).

A socio-dynamic perspective also presents researchers with several challenges. No matter how creativity researchers try to account for the social-dynamic features of creative expression, there likely will be important aspects that are unaccounted for and obscured. This, however, does not mean that we should retreat to the simplicity of more static approaches. Rather, we should acknowledge the challenges, while still working toward a more balanced approach -- one that engages with (rather than attempts to eliminate) the complexity. In what follows, I outline a few initial steps that researchers can take in that direction.

- ***Socio-dynamic partnerships.*** Creativity researchers cannot "go it alone" when attempting to account for the socio-dynamic features of creative expression in classrooms. Rather, establishing partnerships with other researchers and members of the K12 educational community will put us in

a position to design studies that better incorporate the socio-dynamic and historical features of particular classrooms and the teachers and students engaged in creative endeavors in those classrooms. Participatory approaches to studying creativity are particularly promising in this regard and can help us develop a more robust understanding of the creative efforts of students, teachers, community members (see Clapp, 2016; Hanchett Hanson, in press).

- ***On-the-fly documentation.*** Given that creativity researchers cannot be in all places at all times or take the perspectives of all participants, researchers can instead design studies that invite students and teachers to document the work they are doing when engaging with creative endeavors. This includes documenting instances when teachers and students have stumbled, needed to start over, or take their work in a new direction. Maintaining a digital (or paper and pencil) journals that include brief sketches, images, and descriptions can go a long way in documenting both the process and progress of groups and also highlight important differences in individual perspectives, reflections, and experiences along the way (Beghetto, in press-c). These kinds of data can add depth and richness to more traditional, snap-shot methods and enable researchers to map out and better understand the development of creative experiences, ideas and outcomes.
- **Micro-longitudinal and experience sampling approaches.** In recent years, creativity researchers have been developing and using micro-longitudinal and experience sampling designs to account for "real-world" and "real time" creative phenomena (Beghetto & Karwowski, in press; Gajda et al., 2017; Glăveanu, 2013b; Silvia, 2017). These approaches can be used to monitor, analyze, and better understand the dynamic social and individual nature of creative processes, creative outcomes, and factors associated with those processes and outcomes. In addition to documenting the trajectory of ideas and outcomes, such methodologies can also examine variations in individual and group behaviors, emotions, beliefs, and physiological states across days and weeks and even smaller intervals, such as minutes and seconds. The use of micro-longitudinal (across days and weeks) and nano-longitudinal designs (across minutes and seconds), can go a long way in revealing the dynamic nature of what have otherwise been treated as static and fixed creativity-related phenomena.
- **Product curation and process exhibitions.** Working in collaboration with educators to maintain and exhibit the experiences, processes, and outcomes of students engaged in creative endeavors can go a long way in uncovering more nuanced and dynamic features of creative expression in educational contexts. Indeed, when we take time to look behind the curtain

of finalized accounts of creative accomplishments, we are able to learn from the messiness of the socio-dynamic process and develop a better understanding of the who, how, what, when, and where of creative expression (Beghetto, in press-a; Clapp, 2016; Root-Bernstein & Root-Bernstein, 2017).

In closing, it is worth mentioning that we have before us an exciting array of new possibilities, perspectives, and methodologies for understanding the socio-dynamic nature of creative expression. The use and continued development of such approaches represents a promising direction for researchers interested in striking a better balance between understanding important within and between person variations in creative expression and the broader socio-dynamic processes and situations that impinge upon collective creative endeavors. The time and effort that researchers put into the development and use of more ambitious and comprehensive methodological approaches and designs likely will result in a more nuanced understanding of creative expression in and beyond educational settings.

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30

Classroom Creative Climate: From a Static to a Dynamic Perspective

Maciej Karwowski

Introduction

The climate of a school or class has been one of the most often used concepts in educational psychology throughout the last half century. Popularity, however, does not mean clarity: quite a typical end for many popular terms in the social sciences. The matter is further complicated by the fact that, in some scholarly works, climate is not treated as a metaphor but as a factor that exerts an apparent influence on the functioning of people. For instance, the ecocultural model (Berry, 1976) highlights that socialization values are not only the result of culture, but also of environmental influences related to temperature, sun, or rainfall. Indeed, socialization in hunting communities proceeded according to entirely different values and goals than in nomadic societies. Many dimensions commonly associated with creativity, such as nonconformity, are higher in nomadic-hunting societies than in nomadic ones.

Therefore, climate (literally taken) does matter. Recently, van de Vliert (2013) showed that the requirements of the environment were a driving force for the development of democracy and the wealth of societies, and extensions of his theory indicate that it could matter also for creativity (Karwowski & Lebuda, 2013; van de Vliert & Murray, 2018). As a recent study demonstrated (De Dreu & van Dijk, 2018) that, between XVI and XX centuries,

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colder temperatures in Europe were associated with a higher level of innovation and scientific discovery.

Yet, in psychological and educational investigations, the climate works rather as a heuristically fertile metaphor than a literal description of temperature, humidity, pressure, or wind. Such a metaphor allows for a description of the school environment and, consequently, for understanding and explaining the diversity of students' performance, school successes, or teachers' well-being (see e.g., Cohen, 2006; Freiberg, 2005).

To begin, let us define climate as "the shared perceptions of and the meaning attached to the policies, practices, and procedures employees experience and the behaviors they observe getting rewarded and that are supported and expected" (Schneider, Ehrhart, & Macey, 2013, p. 362). Climate relates to the human perception of reality, but this is a perception that is shared by different people. It is only when this sense is distributed that one can talk about a particular school's or firm's climate. The climate is also usually being distinguished from the school's culture, which is usually equated with norms and values shared at the level of the institution and therefore more strongly rooted in its history (Deal & Peterson, 2016; Heck & Marcoulides 1996). And although there are some arguments to consider climate as a subset of culture (see e.g., an overview Van Houtte, 2005), this chapter rather argues for its relative separateness and focuses on the dynamic side of the climate for creativity.

Interest in the climate of classrooms began with the now classic theory of Lewin (Lewin, Lippitt, & White, 1939). In particular, it started with the popularization of the famous experiments on "climate of leadership" carried out at a Child Welfare Station. Early works relied heavily on the metaphor of an "organizational personality" in climate analysis. Just as personality is an individual property of the individual – making it possible to describe an individual concerning universal attributes – the climate is treated as a substitute for the personality of the school or class.

Creative Climate

The creativity literature offers a dozen or so theoretical models of creative climate (see Hunter, Bedell, & Mumford, 2005, 2007 for an overview), with a special focus on the models proposed by Amabile (Amabile, Conti, Coon, Lazenby, & Herron, 1996), Anderson and West (1998), and Ekvall (1996). These three models arise from different theoretical perspectives and inspirations but share some similarities. First, they all refer to organizational climate and usually analyze the functioning of firms. Second, they consist of several

similar categories, such as organizational or supervisory encouragement, feeling of freedom and challenge, sufficient resources, trust, idea time, humor or risk-taking, to name a few. The problem with these dimensions' discriminant validity is the third common characteristic of these models – indeed, each model contains aspects that are hardly separable. This objection, however, is likely not the biggest problem of these theoretical perspectives. Complete separateness of categories is an exception rather than a rule in the case of many theoretical models. What's more problematic is the largely enumerative nature of many ingredients in models of creative climate. These factors and subfactors too often form a wish-lists of favorable characteristics of the environment rather than theoretically plausible and consistent dimensions. Indeed, as one of the reviews (Mathisen & Einarsen, 2004) noted, multiplicity of categories in climate models is rather excessive and quite rarely justified. This is in line with an in-depth analysis of climate models (Hunter et al., 2005), which distinguished fourteen different dimensions of creative climate. Isn't it possible for the climate for creativity to be precisely described using fewer categories?

Another doubt related to many climate models is the assertion of "apparent interaction." Although authors usually stress that different categories are abstracted only for conceptual clarification and, in reality, co-exist in different configurations, these configurations are rarely explicitly theorized and empirically analyzed. Instead, studies boil down to the analysis of main effects rather than interactions. The third objection concerns the possibly curvilinear nature of the relationship between climate factors and creativity. The conviction of a place conducive to creativity as idyllic and flourishing with excellent interpersonal relations and clarity of the tasks being carried out is a myth. It was demonstrated several decades ago (Pelz, 1967) that scientists and engineers obtained the most creative results in environments full of trust and security, but also in conditions of intellectual challenge, anxiety, and disorder. Such a "creative tension" that flowed from the ambient climate translated into the most exceptional creativity. Thus, the problem concerns the character of the links between climate components and creative behavior. Are these links linear, as many models seem to assume (e.g., Ekvall, 1996), or are they curvilinear, rather? And if they are curvilinear, what is their shape? Is it an inverted U, where average intensity of trust or support is most conducive to creativity, or, rather, is it U-shaped, with the low and high levels being more favorable than the average? Of course, other curve shapes with more than one optimum are also possible.

The last charge is a frequent lack of an explicitly characterized level of analysis the climate is measured at (see discussion Schneider et al., 2013). If the climate is measured at school or class level, i.e., at the aggregate level, and we

observe positive relations between this climate and creativity, there are likely two primary interpretational paths: the climate either stimulates creativity (i.e., the atmosphere in the school or classroom is beneficial for creative activities and serves as a driving force for the development of creative abilities), or the creative atmosphere of the learning place is a magnet that attracts creative pupils to it. It is likely that at least one additional explanation – taking into account the problem of endogeneity, always present in educational research – exists as another reason for the climate in schools and the intensity of creativity indicators. It could be socio-economic status, which is a likely correlate of both the school's climate and the creativity of students.

Climate analysis at the individual level also has far-reaching consequences for the interpretation of obtained results. Well, if the measurement is done focusing on personal perception, then the potential relationships that occur between climate and creativity, do not necessarily mean that the school climate supports the development of students' creativity, but rather that creative people perceive the climate in their school differently than do less creative people.

The classic issue in the climate operationalization and measurement is the problem of level of analysis of this very construct. Conceptually, the climate is theorized as the ecological level phenomenon, yet is usually operationalized by aggregating individual responses given by students or teachers to a set of questions. Aggregation procedures can be different but, to justify their application, it has to be demonstrated that we are talking about the phenomenon which is indeed measured on a group level. Most often, this is done by estimating the ratio of the variance of individual climate dimensions between schools and inside them (see LeBreton & Senter, 2008 or Morin, Marsh, Nagengast, & Scalas, 2014 for an overview). It is guided by the assumption that, if individual assessments within the same schools are sufficiently similar, the researcher deals with shared characteristics and not just individual perceptions.

Classroom's Creative Climate

An overview of the existing models of organizational climate conducive to creativity, supported by an overview of crucial climate categories identified in a meta-analysis (Hunter et al., 2007), inspired a more parsimonious theoretical model of climate for creativity in the classroom. Three key components of this model, together with sample items that allow to measure them are listed in Table 30.1 below (see Karwowski, 2009, 2011a, 2011b).

Table 30.1 Sample items of class Creative Climate Questionnaire

Interpersonal dimension	Task dimension	Dynamism dimension
1. I trust most of my classmates 2. I am convinced that my suggestions will be heard by my teacher 3. I trust my peers 4. Our class is very well-knit	1. Our teachers encourage us to propose our own solutions to various problems 2. At school, we have many opportunities to show the originality of our thought processes 3. Teachers mind our freedom while we solve problems they pose 4. Teachers support our original ideas	1. Our teachers frequently surprise us 2. Our teachers like giving us surprises 3. Learning in my class taught me that it's worth to occasionally take risks 4. In our class, we expect the unexpected

The interpersonal dimension refers to relationships and attitudes of people towards each other. The task-engagement dimension refers to the possibility of deciding on the selection and ways of implementing tasks and the support of creativity provided by teachers. The third dimension – the level of dynamism and energy – determines a school's or classroom's stability versus variability. These three interrelated dimensions are theorized to stimulate students' creativity. This does not mean, however, that high scores on each scale are considered the most desirable – it is equally plausible that the relationships might be non-linear or qualified by interactions between interpersonal, task, and dynamic characteristics. Indeed, creativity requires balancing between uncertainty and conflict, trust and dynamism.

Below, I briefly illustrate how the class' creative climate may be analyzed and placed on a continuum from relatively static to quite dynamic approaches. To achieve this goal, here I utilize and briefly describe data from two studies – a large longitudinal investigation of primary and middle-school students (N = 2400) and a small, yet intensive observational study that was already published (Gajda, Beghetto, & Karwowski, 2017).

A Static Illustration

An example of a relatively static illustration of the role played by class' creative climate stems from quite a typical analysis usually conducted in such a case, namely – a latent variable approach. Although generally robust and informative, this set of techniques is generally based on covariances and correlations between variables. It is therefore unable to tell much more than correlations themselves. Indeed, the hypothesized structure of class creative climate

estimated with the use of a confirmatory factor analysis (and controlling for nesting students within classes) fit the data well. All typically applied fit indices called for an acceptance of a three-factor model, because a comparative fit index (*CFI*) and Tucker-Lewis Index (*TLI*) were equal or higher than 0.95 (*CFI* =0.957 and *TLI* = 0.950), and the lack of visible misfit was demonstrated by low root mean square error of approximation (*RMSEA* = 0.05, 90% confidence intervals: 0.051–0.059). It suggests that, indeed, classroom creative climate may be effectively operationalized using the factors of interpersonal trust, task engagement, and dynamism. These dimensions were robustly linked to each other, yet these correlations were not too large, hence providing also compelling evidence for discriminant validity. Task engagement was quite strongly related to dynamism (latent correlation of $r = 0.75$), while the links between interpersonal trust and task engagement ($r = 0.52$), and trust with dynamism ($r = 0.53$) were robust, yet indicating the discriminant validity of all components. Importantly, a significant portion of climate dimensions variability was connected with each classroom – 14% of the variability of trust, 8% of task engagement, and 5% of perceived dynamism were linked to each classroom.

Consequently, another step was an attempt to examine the extent to which class climate is able to say something about the level of creative activity within a classroom. As we used a wide range of items describing different creative activities within a school (a modified Inventory of Creative Activities and Accomplishments, see Diedrich et al., 2018), which resulted in a highly reliable scale of creative activity ($\alpha = 0.90$), I tested whether the aspects of class creative climate predict the intensity of creative activity at school. The regression model indeed demonstrated that climate is related to creative activity, yet the effect size was mediocre ($R^2 = 2\%$) and the only statistically significant effects were observed in the case of positive interpersonal relationships (ß = 0.05, $p = 0.03$) and dynamism (ß = 0.11, $p < 0.001$) (see also Fig. 30.1). Therefore, although significant, the effect size of these links was rather disappointing; the links were positive, yet huge room for exceptions from linear effects was observed. Does it mean that all in all the climate is unable to make too much of interesting and important assumptions about creative activity? Not necessarily so.

Putting Some Dynamism into the Static Picture

The question of how to analyze quite static cross-sectional dataset more dynamically remains. A promising answer stems from psychometric network

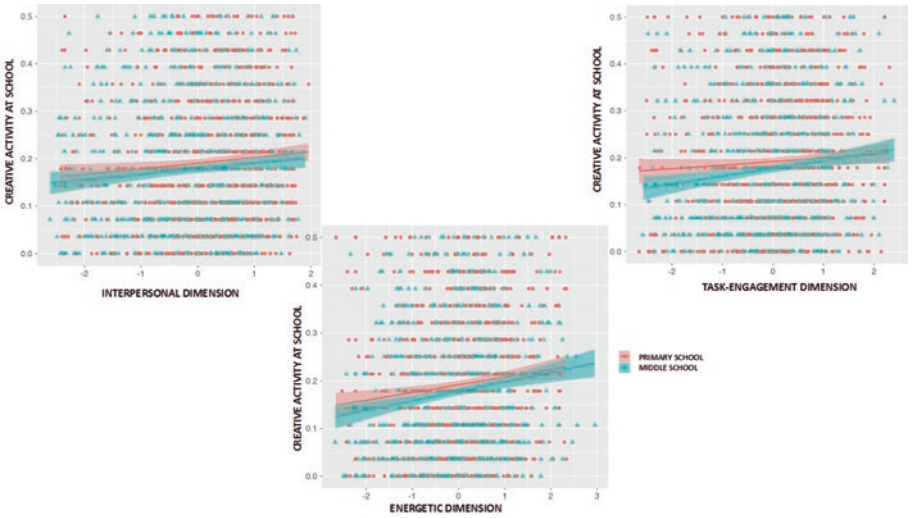

Fig. 30.1 The links between class climate dimensions and creative activity within primary and middle-schools

models (e.g., Epskamp, Rhemtulla, & Borsboom, 2017). Psychometric networks allow us to illustrate the interactions between variables, facets, and factors and show these links in a way that opens some new inspirational possibilities. The panel A of Fig. 30.2 shows the network analysis of class climate items. Indeed, three quite clear factors emerge – consistently with previous confirmatory factor analysis results. What would happen, however, if we simultaneously analyzed the relationships between different aspects and facets of class climate and creative activity in the school? Such an illustration is provided on the panel B. Panel B shows a much more dynamic patterns of relationships between specific aspects of class climate and detailed creative behaviors. Hence, even if the correlations between aggregate indices of dimensions of creative climate and creative behaviors were not impressive, there may be much more interesting and unique links between certain teachers' behaviors or attitudes toward peers and the tendency to engage in very specific creative activities.

The Dynamic illustration

Very likely, a fully dynamic analysis is not really possible even with the use of the large dataset obtained in a study with psychometric measurement of creative climate. Longitudinal or micro-longitudinal data may offer more in this

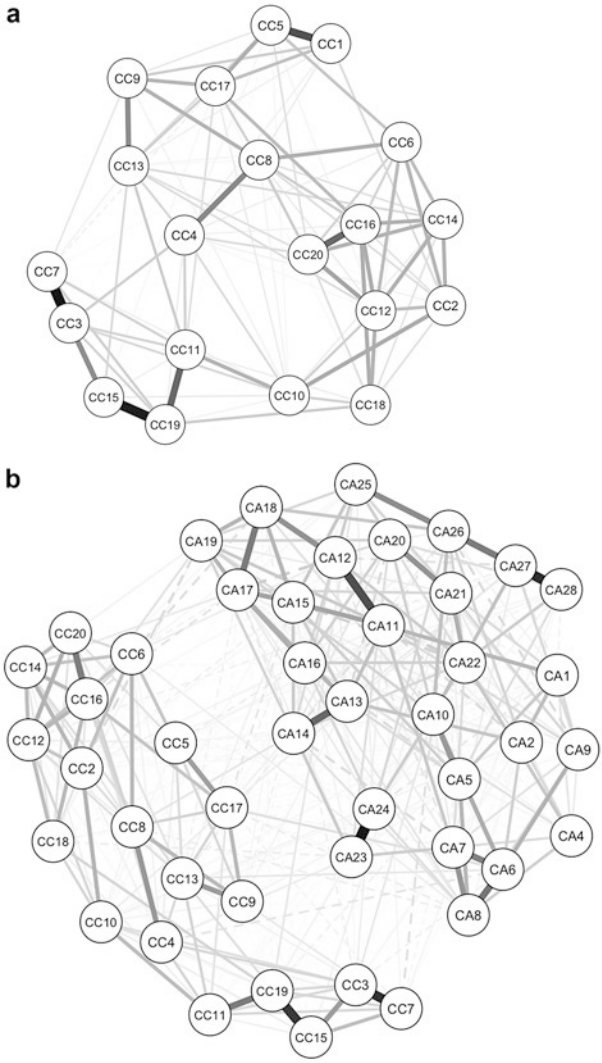

Fig. 30.2 Network analysis of class creative climate items (Panel A) and Joint network analysis of creative climate and creative activity items (Panel B). On Panel B, CC – refers to creative climate items and CA to creative activity items

respect. To illustrate the benefits, let us briefly look at the results of a recent observational study in classes with positive, negative, and null relationships between students' creative abilities and their school grades (Gajda et al., 2017). In this study, teachers' and students' behaviors in class were observed and recorded every five minutes. Factor analyses have revealed a clear four-factor structure of observed behaviors in both cases. Among teachers, these

were factors of caring, encouraging creativity, emotional support, and risk acceptance, while among students these were factors of misbehavior, positive engagement, self-expression, and ideation (see Gajda et al., 2017 for more details). Interestingly, the factors obtained among teachers resemble the main categories of the climate for creativity discussed earlier – while caring and emotional support describe two different aspects of the interpersonal dimension of the climate, encouraging creativity refers to task engagement, while risk acceptance may be linked with the dynamism dimension. Hence, this observational study, even if originally not framed in that way, may be considered as a study of classroom creative climate, with the results obtained in a more ecologically valid way. A closer look at the differences between the three categories of classes and the dynamics of changes of teachers' behaviors during a lesson brings some interesting effects (Fig. 30.3). The factors that distinguished the class with positive links between students' creative abilities and their school grades are linked to teachers' caring and emotional support (Fig. 30.3, panel A). In other words, it was interpersonal characteristics of class life that made these classes different from those with null or negative links between creative potential and school functioning. Interestingly, there was also a statistically significant effect of time, which indicated that, overall, encouragement for creativity (together with emotional support) decreased with time – its level was significantly higher in the initial moments of the

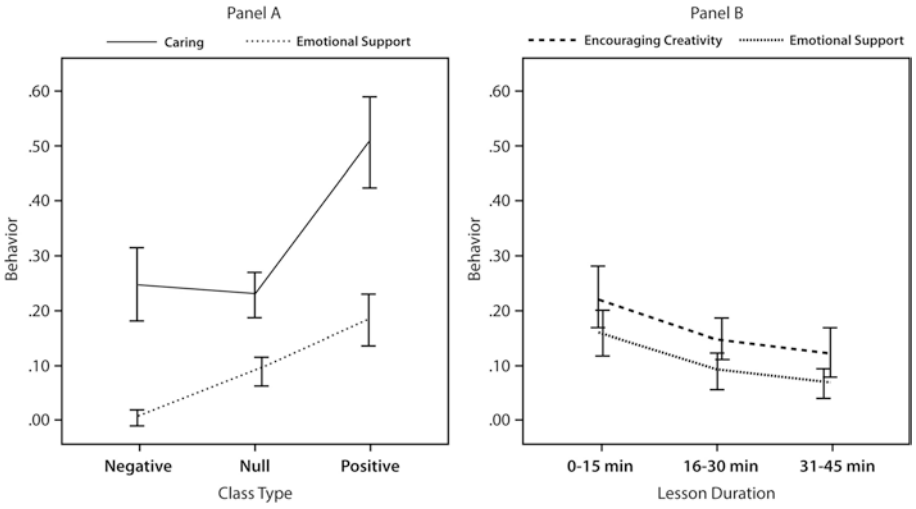

Fig. 30.3 Differences in teachers' behaviors across classes characterized by negative, null or positive links between students' creativity and their school grades (Panel A) and the changes of teachers' behaviors across time (Panel B). Estimated based on Gajda et al. (2017) results

lesson and decreased with time (Fig. 30.3, panel B). Such changes are impossible to be captured by the questionnaire-based, static measurement, which is exactly why this dynamic is worth studying. Thus, ethnographic or blended methods, using observational data and complex statistical models, can shed some new light on the dynamics of class climate.

Concluding Thoughts

Climate for creativity is not only a popular research construct among creativity researchers; solid reasons exist to believe that it is also a relevant environmental factor that stimulates or inhibits the likelihood for creative activity in a class. Yet, to take advantage of its explanatory power, climate not only should be precisely defined and operationalized, but also analyzed in a possibly dynamic manner. Additionally, although several theories do assume that climate for creativity in organizations consists of a large number of dimensions, as proposed in this chapter, when dealing with class, these dimensions could be effectively reduced to three main areas: interpersonal relationships, task-engagement (encouragement of creativity), and dynamism.

To take home the message of this chapter, it is a call for a more dynamic micro-assessment of creative climate in the classroom. As demonstrated above, such a perspective holds the promise to enrich our understanding of processes that are happening in the classroom and to show the role of situational influences. This call fits perfectly into, and holds the potential to inform and enrich, the social movement observed in the last decade in creativity science. Although the social approach to creativity may be considered classic now (e.g., Amabile, 1983; Csikszentmihalyi, 1999; Simonton, 1975), it was the last few years that moved the field into more socio-cultural rather than socio-cognitive theorizing (Glăveanu, 2010a, 2010b). This approach does not theorize social constructs as external realities; factors that influence creative behavior or moderate the links between psychological phenomena. Instead, social factors are considered the immanent elements of the creativity puzzle, *conditio sine qua non* of creative inspiration, activity, production, communication and assessment. Recent theoretical but also methodological advances in the sociocultural psychology of creativity (e.g., Glăveanu & Lahlou, 2012) effectively illustrate this dynamic and interactive approach, showing the complex interaction between the environment and individual during the creative process (Glăveanu, 2015) or the dynamics of dyads' functioning during the creative generation (Glăveanu, Gillespie, & Karwowski, 2018). It is important to note, that the relevance of this perspective has been already recognized

by educational psychologists (Glăveanu & Beghetto, 2017; Rubenstein, Callan, & Ridgley, 2017) and even somehow inspired their empirical investigations (Gajda et al., 2017; see also Beghetto & Karwowski, in press).

To conclude, the educational psychology of creativity may find the construct of classroom creative climate as allowing for more comprehensive theorizing about students' and teachers' creative cooperation and activity in and outside the classroom. Importantly, though, such an analysis may sometimes lead to the conclusion that creative climate should not be assigned to the class as its stable (personality-like) characteristic, but rather as something more ephemeral and short-lived – an emergent quality that sometimes happens between students and teachers; something that should be recognized and fostered but is difficult to observe and analyze in its full complexity. After all, taking the challenge of such analyses of creative climate requires not only new methods, but also a more inclusive epistemological perspective.

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31

Is Creativity Compatible with Educational Accountability? Promise and Pitfalls of Using Assessment to Monitor and Enhance a Complex Construct

Jonathan A. Plucker and Rasis Alanazi

Creativity is not a predominantly cognitive construct. The emerging science of creativity has produced considerable evidence that creativity has a large social component, and it may even be viewed as a primarily social enterprise (Lebuda & Glăveanu, this volume). For example, social perspectives on creativity processes frequently appear in the literature (e.g., Carmeli, Dutton, & Hardin, 2015; Perry-Smith & Mannucci, 2017), sociocultural theorists have argued that a creative or talented act cannot be separated from its social context (Glăveanu, 2013, 2015), and some creativity researchers have argued that social inputs and outputs are among the most important aspects of the creative process (Plucker, 2016).

As educational psychologists, we are primarily concerned with applying creativity research to classroom and school settings in an effort to find efficient and effective ways to develop student creativity. Given that many surveys of business and community leaders over the years have noted the importance of creativity for both community and individual success and quality of life, one could reasonably assume that an emphasis on creativity in our schools could be taken for granted. Yet we are continually frustrated by the thinly veiled lack

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of support for enhancement of creativity in schools around the world, with lots of lip service but few concrete actions to enhance student creativity.

One probable reason for the present situation is the lack of attention to creativity in large-scale K-12 educational accountability systems. These systems tend to drive instruction and curriculum in many countries, and none currently includes creativity as either an input or output of K-12 education. We also believe that adding creativity to accountability systems is a primarily social act: Doing so would ideally lead to greater transparency about creativity instruction (or the lack thereof) in our schools, provide stakeholders with information to help enhance that instruction and development, and lead to improved sociocultural conditions for creativity in the future. Finding ways to incorporate creativity – in constructive, effective ways – into these systems should be the primary focus of those researchers, educators, and advocates who wish for greater emphasis on creativity, innovation, and entrepreneurship in our schools.

In the following sections, we review the sociocultural perspective on creativity, note relevant advances in creativity assessment, and describe the limited, previous efforts to incorporate creativity into large-scale K-12 accountability systems. The chapter concludes with guiding principles for the creation of such systems based on these recent developments and efforts.

Sociocultural Perspectives on Creativity

A growing body of research on learning and knowledge in the past decades led to many changes in the field of psychology and cognition. Researchers interested in creativity have gradually shifted from the traditional individualistic view of creativity as a single trait into more of a socially constructed trait that occurs within (and inseparably from) a social context. This shift has led many researchers to view creativity through a sociocultural lens with its emphasis on social interaction as the key mechanism for human development. Thus, the interaction between students with each other and a more knowledgeable other "adult" eventually leads learners to take control of their own learning in a joint activity in a similar context (Lave & Wenger, 1991). Views of learning expanded to theorize that learning is distributed, interactive, context-specific, and a result of learners' engagement in the learning process (Cole & Engeström, 1993; Chang-Wells & Wells, 1993; John-Steiner, Panofsky, & Smith, 1994; Rogoff, 1994). Therefore, many researchers in the field of creativity emphasize "context" when they define creativity (Kaufman & Beghetto, 2013; Plucker, Beghetto, & Dow, 2004).

The "Five A" Framework

Rhodes' (1961) "Four P" framework greatly influenced scholarship seeking to understand the phenomenon of creativity. Rhodes framework of creativity (1961) known as the "four P's of creativity" captured four main elements that foster creativity; the person, the process, the product, and the press. According to Glăveanu (2013), one major limitation in the four P's framework is that researchers can only look into and examine each element separately without examining the elements as a whole which hinders our knowledge. He proposed a "Five A" framework as a sociocultural alternative, consisting of actors, actions, artifacts, audiences, and affordances in interaction. Although many of the Five A fundamentals exist in the Four P framework, the sociocultural perspective offers a much stronger emphasis on interaction and, as a result, can be viewed as a more accurate lens for which to view real world creativity, which is clearly a social, contextual, and interactional construct.

From Person to Actor Glăveanu argues that using the term "person" diminishes the actual acquisition of creative traits and overlooks the importance of human interactions during creative activity. He suggested switching the term "person" to "actor" which represents more of the social relationship that occurs naturally in a context which is often neglected. Glăveanu (2013) defines an actor as "a system of social relations and cultural traditions regulating these relations" (p. 71). Little is known about how people perform and create as a whole entity rather than a single personality trait. One major downfall for using large psychometric testing of creativity, personality, and intelligence for large samples is that it isolates the person from the context. Therefore, we need to capture the context in which the actor is engaging in a creative work.

From a Process to Action It is important to keep in mind that we acknowledge two aspects of creativity; the internal psychological trait and the external context. Therefore, one cannot fully understand creativity without looking into personality and cultural traits as interconnected. This provides a solid foundation for the integration of the creative action between three domains; the actor, the audience, and the artifacts (Glăveanu, 2013, p. 73). By looking into the creation action, we should consider three questions; what is created? what are the characteristics of the creator and what is the context in which the creative product was made?

From a Product to Artifact In his work, Glăveanu switches the term "product" to "artifacts" to emphasize the broader connections between culture,

and humans that accumulated the creative act in any form or shape. Artifacts are not limited to a materialistic product only. These artifacts could be ideas, performance, or actions that are acknowledged as creative. For example, the chef Dominique Ansel of Dominique Ansel Bakery has created what is known as cronut "croissant-doughnut" pastry. In this example, the cronut is considered as an artifact by the chef. An adaptation of sociocultural epistemology provides an insight into the cultural participation that chef Ansel engaged in which led to the artifact. By referencing the product as an artifact, we are able to link the creators, audience, creative outcomes, and creative actions with each other in a holistic manner (Glăveanu, 2013, p. 74).

From Social "Press" to Audience In Rhodes's framework, "press" is used to explain the influence of the environment and the society together on creators. However, the term "press" doesn't convey the different roles of different entities which results to the artifact. On the other hand, the term audience explicitly communicates the interaction between the creators and people during their stages of creation and the perception of the creative outcome. Through a sociocultural lens, the internalization process of the active audience by the creator is an essential step in a creative action.

From Material "Press" to Affordance In order to appreciate and value the relationship between humans and the surrounding objects, one should take into consideration the affordance of such objects. The idea of affordance aligns heavily with sociocultural psychology in which objects direct our actions because of their "constructed meaning" that fulfill our needs which changes from person "creator" to another. For example, a paperclip could be used for different purposes to fit the needs and desires of the user.

Sociocultural investigations of creativity have continued to develop since the publication of the Five A framework (e.g., Biasutti, 2015; Glăveanu, 2015; Plucker, McWilliams, & Alanazi, 2016), often applied within specific domains of creativity (Cekaite, 2018; Strickfaden, Stafiniak, & Terzin, 2015). Regarding K-12 accountability systems, the major implications of sociocultural perspectives on creativity and the Five A framework are that (a) social interaction in a necessary component of creativity, (b) audiences and interactions need to be accounted for, and (c) creativity is universal and valuable across domains and tasks.

K-12 Accountability Systems

Although much of the description and research in this section is specific to American contexts, accountability systems are prevalent throughout the world, at both K-12 and higher education levels (de Wolf & Janssens, 2007; Stensaker & Harvey, 2010; Välimaa, 2004; Wöbmann et al., 2007). For example, in Ontario, Canada, school accountability is measured through the Education Quality and Accountability Office, with a stated goal to "measure student achievement in reading, writing, and mathematics in relation to Ontario Curriculum expectations" (Calman & Crawford, 2013).

The building and implementation of K-12 accountability systems has been a major focus for policymakers, educators, and families in the United States for many years. Although educational accountability had been a theme in some states for nearly a century (Carnoy & Loeb, 2002), the idea that the quality of American schools should be evaluated by testing student progress toward specific learning standards (generally focused on math and reading/English) took root after the publication of the *A Nation at Risk* report in 1983 and became a major policy theme during the first Bush Administration (Nichols, Glass, & Berliner, 2006; Ryan, 2004). By 2000, most states had voluntarily implemented school accountability systems based largely on student achievement testing, although the large-scale effectiveness of these systems was considered by some critics as very limited due to the patchwork nature of accountability approaches among the many states (Fullan, 2009).

With the emergence of the No Child Left Behind (NCLB) Act in 2002, measuring school effectiveness and publicly sharing the results became a required component of each state's K-12 education system. In addition, schools and districts whose students did not make sufficient progress toward proficiency goals were subject to mandatory interventions, including student tutoring and limited forms of school choice. States could continue to have their own accountability system, but they were also required to have the NCLB-mandated system or risk the loss of the state's federal education funding (too high a price to pay for most state governments). Initially, measuring schools' effectiveness was focused on measuring student performance toward academic learning standards in grades 3–8 (Betebenner, 2009; Wellman, 2001; Yen, 2007), although the range of assessed outcomes and included grade levels has grown over time. Although highly controversial and contentious, it can be argued that NCLB's approach to accountability and assessment resulted in significant gains in student learning as measured by the mandated testing (Dee & Jacob, 2009; Fullan, 2009; Polikoff, 2017).

Regardless, the lack of popularity for NCLB – due to concerns about narrowing of the curriculum, snapshot testing of students rather than assessment of student growth, and other issues (U.S. Department of Education, 2011; Zvoch & Stevens, 2006) – made its reauthorization difficult. It was finally reauthorized as the Every Student Succeeds Act (ESSA) and signed into law by Pres. Obama in 2011. The law limited the federal government's involvement in state education and provided new guidelines for state accountability systems (Fránquiz & Ortiz, 2016; McGuinn, 2016).

Although states are still required to assess all students, they were given considerable flexibility regarding the specific tests to be administered, they were encouraged to assess student learning growth over time, and they were required to use a broader range of both academic and non-academic indicators, including a wider range of students outcomes (McGuinn, 2016). As a result, most states added science assessments, and – most notably for our purposes in this chapter – many states included indicators related to career and college readiness (Aldeman, Hyslop, Marchitello, Schiess, & Pennington, 2017). Creativity is often included in these CCR or "21st century" indicators.

However, the rush to include CCR indicators ran into two issues. First, they were largely included without any thought to defining the relevant constructs and how they could be assessed. Second, and perhaps more importantly, most states – even those who included creativity in their CCR framework – ignored the construct because it was considered ill-defined, did not have any assessments of high quality, and had no empirically-supported interventions (see Plucker, 2017). Creativity researchers found themselves in a difficult position: Policymakers and educators were endorsing the construct as a critically important student outcome, but they generally wanted nothing to do with a field that they barely knew existed. As a result, the field has had little impact on the inclusion of creativity in accountability systems.

Assessment of Creativity

Of course, these evaluations of the field of creativity studies were uninformed, to put it mildly, especially regarding creativity assessment. A comprehensive review of advances in the measurement of creativity is beyond the scope of this chapter and volume, but several recent developments are relevant to this discussion. First, improvements in the scoring of divergent thinking tests have been substantial, with a great of promising work in progress (e.g., Plucker, Qian, & Schmalensee, 2014; Silvia, Nusbaum, & Beaty, 2017). From controlling fluency contamination effects to incorporating subjective judgments

into scoring techniques, the field has seen substantial growth in our understanding of how real-world creative judgments occur and, more importantly for our purposes in this chapter, how they can be modeled in widely-used creativity assessments.

However, a major shortcoming of creativity assessments – at least within the context of school accountability – is the difficulty of scaling such assessments. Most are highly labor-intensive to administer and/or score, and very few have been normed with the populations of interest (Plucker, Makel, & Qian, in press). In addition, from a sociocultural perspective and given the Plucker et al. (2004) definition's emphasis on context when identifying creativity, the norming issue is less of a concern during the traditional, small-scale administration of these assessments. For example, traditional methods to determine originality in a pool of divergent thinking responses focus on statistical infrequency, the relative frequency (or lack thereof) of a particular response in a given item pool. This approach automatically incorporates the students' local context into the assessment of creativity (and in ways that the few nationally normed assessments, such as the Torrance Tests of Creative Thinking, do not). Moving to large-scale assessment raises questions about appropriateness – will students in the same state, region, or country but living hundreds of kilometers apart always be providing responses in similar contexts? Given residential segregation in the U.S. and other countries (see Andersson & Malmberg, 2018; Krysan & Crowder, 2017), that appears highly unlikely. Addressing these issues is critically important for the long-term success of any accountability system focusing on creativity.

Large-Scale Creativity Assessments and Accountability Systems

Efforts to create large-scale creativity assessment systems have been few and far between, and they have at best limited success for the reasons mentioned above. For example, the state of Massachusetts established a commission to design the Massachusetts Creativity Challenge Index, which focused on inputs, because "creative outcomes are subjective and variable, so how can there be a right or wrong answer? Instead, we can measure 'inputs,' a common practice in business and health. For example, the Center for Disease Control surveys activities and behavior (inputs) to assess public health (outcomes) in demographic subsets such as youth-at-risk, pre-natal health, and the elderly" (Rosenberg & Hunter, 2016, p. 1). This effort, with a heavy emphasis on arts education, was not able to produce the desired index.

The Massachusetts effort did lead to attempts at such an index in other states, most of which appear to have ended similarly, with no index, let alone an attempt to field test such a system. An exception is in the state of Oklahoma, which was inspired by the Massachusetts initiative and created the Oklahoma Innovation Index (OII). The Oklahoma index focuses on eight classroom activities/ processes that are related to creativity, such as providing students with opportunities to offer predictions or take academic risks. As with the Massachusetts efforts, student outcomes are not part of the index. As of the writing of this chapter, information on the OII, including the result of its pilot administration and plans for statewide implementation are not available.[1]

How important is the inclusion of outcomes? Not including outcomes is certainly understandable given the technical issues associated with the assessment of creative cognition discussed earlier in the chapter. And when these efforts began over five years ago, the potential of artificial intelligence to assist with these efforts was not well understood. But the justifications for focusing only on inputs were largely theoretical and debatable. For example, Rosenberg and Hunter (2016) state that "creativity … is difficult to define, ever changing, and affected by individual choices" (p. 1). Well, yes, but so is student learning, and we assess student learning outcomes on a near constant basis all over the world. This mythologizing of creativity as an essentially unknowable, unmeasurable construct is self-defeating, especially when trying to convince policymakers of the value of including creativity in accountability systems.

In addition, the exclusion of outputs put such an index at odds with existing education accountability systems, which are largely (and often exclusively) focused on outputs. This is widely believed to be the mechanism through which such systems create change: School efforts to support student achievement of specific outcomes become transparent and public, serving as both a carrot and a stick, so to speak (see Polikoff, 2017). Including inputs with no connection to the desired outputs renders moot the addition of creativity into the K-12 accountability framework.

What Should an Ideal System Look Like?

Given the sociocultural revolution within the field, advances in creativity assessment administration and scoring, and this recent history with large-scale assessments and accountability, is it possible to work creativity into

[1] See http://stateofcreativity.com/oklahoma-innovation-index/

accountability systems? And if so, how should such systems be designed? We believe that creation of a comprehensive, socioculturally-based, large-scale creativity assessment system for K-12 accountability systems is possible, if very difficult, and that it can be designed using the following principles.

Is Should Reflect Best Practice for Accountability Systems in General

At a minimum, any creativity component should follow general principles of K-12 accountability systems. Many of these principles are intended to maximize the effectiveness of these systems, but others relate to data quality, usability, and public transparency. In no particular order to importance, any accountability system should be easy to understand (complex systems are easier for practitioners to ignore), the economic benefits should be clear (to increase policymaker buy-in and ownership), all schools should have an equal opportunity to succeed (schools subject to socioeconomic/deprivation effects cannot be automatically disadvantaged in the scoring), and the system should incentivize attention to student creativity without necessarily mandating certain interventions and enhancement strategies (essentially mirroring market forces and placing faith in educator skill and motivation).

It Should Reflect that Creativity Is a Complex Construct

Given that creativity is such a complex construct – with cognitive, social, individual, cultural, attitudinal, environmental and motivational, not to mention domain-general and domain-specific, aspects (among others!) – accountability systems that focus on merely one or two components are, by definition, too narrow and lacking in face validity. In addition, even a single aspect of creativity can be very complex. For example, Karwowski (this volume) and Beghetto (this volume) argue that conceptualizations of creative classroom climates have been viewed as static when, from a sociocultural perspective, they are highly dynamic. Or attitudinal aspects: Research has established the importance of certain personality factors to creativity (openness to new experiences, tolerance of ambiguity), creative self-efficacy, and related facets. PISA has long sought – and believes it has achieved – national-level measures of subject-specific creative problem solving (e.g., Sebastian & Huang, 2016). But even if successful, these efforts are still individual in

nature and cognitive-focused, far too narrow to represent creative potential comprehensively.

More to the point, previous and current efforts focus largely on individual aspects of creativity, when the social dimensions of the construct are important if not predominant (Lebuda & Glăveanu, this volume). This complexity has tremendous implications for creativity assessment and accountability systems, and they need to account for the complexity in some way.

It Must be Scalable

This characteristic is obvious, but given that it is the Achilles' Heel of any creativity accountability system, it deserves special attention. Nearly all cognitive assessments of creativity involving significant hand-scoring, and this limitation makes nearly all existing measures non-starters for accountability, where scoring 1,000,000 responses (or many more) is a minimum requirement. This requirement alone appears to render the creation of such a system impossible.

But advances in machine learning lead us to be optimistic. Over multiple iterations, human involvement in the scoring of, say, 5 million responses to a divergent thinking task, even figural responses, should be able to be minimized over time due to advances in artificial intelligence. That said, the more realistic (i.e., complex) the scenario, the more difficult and likely less successful scoring of creativity assessments via machine learning will be. This ease of administration/external validity trade-off is not new to creativity assessments, or cognitive assessments in general, but the trade-offs are particularly acute when considering application at scale.

It Must Emphasize Both Individual and Social Aspects

Given that creativity has both individual and social aspects, a creativity accountability system must include indicators that value both aspects. Or, barring that, the system must provide information that can help promote both intrapersonal and interpersonal creativity within schools. This principle will be a major barrier to accountability for creativity, given that existing accountability systems focus on learning as an individual act, with acknowledgement of its social foundations only through aggregation of data at the classroom, school, district, and regional levels.

It Must Provide Developmental Data for Student and Schools

Ideally, these systems will not only serve a public accountability role but also provide data that stakeholders (educators, families, community leaders, the students themselves) can use to improve student creativity. This issue was identified in the rush to create teacher evaluation systems in the U.S. over the past decade (Darling-Hammond, 2014): Many of the efforts did not provide data back to teachers and their supervisors that was useful for improving practice, and many of these efforts are now seen as counterproductive and ultimately wasteful (e.g., Firestone, 2014; Hallinger, Heck, & Murphy, 2014).

Conclusion

The purposes of this chapter are to (a) make a case for the inclusion of creativity in educational accountability systems, (b) situate this argument within the context of social creativity and sociocultural perspectives on creativity, and (c) provide an initial set of guidelines for the design of such systems. We believe inclusion of creativity is the primary way to elevate the inclusion of creativity in K-12 education from an optional outcome, much understood and misapplied, to a major educational outcome viewed as a necessity and, therefore, much more seriously.

That said, we acknowledge that the parameters provided in this chapter may lead some observers to believe that accountability for creativity is impossible. And, given current technological limitations, a well-designed, optimally effective system may still be just outside of our reach. But with rapid improvements in our understanding of creativity, its assessment, and the ability of machine learning to allow software to evaluate diverse student assessment responses, our reach may be extending further than many people realize. However, implementing creativity assessment and accountability systems that do not hold to the principles described above is likely to lead to unsuccessful implementation and provide barriers to future, better designed efforts.

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32

A Creative Peer-to-Peer Methodology

Lene Tanggaard and Charlotte Wegener

This chapter develops the idea of a creative peer-to-peer methodology. It is based on a methodological experiment that we have developed over the last five years involving the co-writing of two so-called 'survival kits for doctoral students and their supervisors (Tanggaard & Wegener, 2016; Wegener & Tanggaard, 2018). The ambition of the two books is to co-create new practices regarding doctoral training and supervision based on tales from the field (Van Maanen, 2011) written by ourselves and our colleagues. This creative methodology is meant to inspire new collaborative practices in doctoral training. Doctoral training is often based on very traditional formats of supervision with professors controlling the content and guiding the process in a more or less hierarchical format. With our creative peer-to-peer methodology, we challenge this framework to allow dynamic supervisory relations with higher potential for learning on both sides.

Our Story

We are writing the two books as colleagues and peers, on the background of having been in a supervision relationship with Tanggaard as the supervisor and Wegener as the doctoral student. We conceive of ourselves as being part

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of a creatively evolving professional relationship build on an initial hierarchy, but also experimenting with this. Over the years, our initial asymmetry has evolved and changed and a dynamic symmetry is now our platform for new kinds of collaboration. In this sense, the supervision has made us peers, and from the outset, we have used co-writing as a chance to reflect on and learn from this dual, relational perspective (Glăveanu, Tanggaard, & Wegener, 2016; Wegener & Tanggaard, 2013a, 2013b).

As part of writing the two survival kits, we ask our colleagues for help. Basically, we have asked them to write us small one- or two pages essays about central, vital and meaningful experiences of their own being either a doctoral student or a supervisor. We encourage them to write about their current experiences or about those standing out from the past, and we instruct them to carefully notice the messy and not necessarily successful parts of this process. In this sense, we are collecting a kind of socially co-created empirical material about learning to write in academia, assisting others who are learning to write, or discovering new way of collaborative writing. Writing is often a lonely endeavour and many doctoral students and early career academics report feelings of isolation and individualizations of performance requirements (e.g. Fergie, Beeke, McKenna, & Creme, 2011). By co-writing and by inviting our colleagues to express their experiences with writing, supervision and peer learning, we create a space for social creativity. This space is an ever-evolving lab for mutual experiment and friendly competition about writing *in* writing. We investigate what it means to write, what writing means to us, who we are as writers, by *doing* it. We rarely talk about writing, we write about writing. This may look sound like a self-absorbed, self-contained activity; however, writing about writing involves reflections on all that writing entails: learning, identity, inspiration, drive, impatience, joy. Learning from our peers and from being peers is our basic methodology, and the present chapter will outline how we did it and reflect on the possibilities choosing this creative approach also in other research contexts.

No More Recipes, However…

Our own co-writing practice evolved as part of our initial supervisor-doctoral relation. When presenting a co-written paper about co-writing at a conference (Wegener & Tanggaard, 2013a), we got feedback suggesting that our approach would maybe inspire doctoral training more generally. The international audience was intrigued by the seemingly non-hierarchical academic culture that allowed the doctoral student to be the invitational part

and suggest a co-writing project to her supervisor. We began to reflect on doctoral training as mutual learning through co-production. Our colleagues at the conference suggested that our approach could be part of developing supervisory relation in a dynamic way as part of future doctoral training.

Our emphasis on practice and learning by doing has also served as the background for inviting our colleagues to co-reflect with us throughout the two books in the form of personal narratives and reflections from their own research journeys. The personal accounts (our own and others) are reflections over unsolved problems, awkward moments, and lessons learned, not as general recipes to be followed. They are necessarily personal statements. As Mills (1952/1980) made clear, learning how to be a researcher is the practice of a craft. We are inspired by Mill's concept of sociological imagination, by which researchers can "understand what is going on in the world and understand what is happening within themselves in their capacity as tiny points of intersection between biography and history in society" (Brinkmann, 2012, p. 18). The researcher's biography and thus the researcher's experience, theoretical orientation, and expectations are important aspects of the research process. However, the researcher's biography and biographic data are not interesting in themselves. In order to achieve novel insights of high quality, introspective, auto-ethnographic accounts must only serve as starting points for thematic, reflective inquiry as Delamont (2009) reminds us. We are convinced though that one account is more valuable than "a dozen codifications of procedure by specialists," as Mills (1952/1980, p. 63) puts it:

> Only by conversations in which experienced thinkers exchange information about their actual ways of working can a useful sense of method and theory be imparted to the beginning student.

Likewise, in a paper titled "Towards an Epistemology of the Hand," Brinkmann and Tanggaard (2010) argue, in line with this pragmatic perspective, that experiencing the world—and knowing it—are functions of our practical activities, of our *handling* the world and its problematic situations. What we experience and know about the world are primarily aspects of things that we interact with and manipulate (literally "operate with our hands"). We do not always see clearly beforehand why we do certain things. Things are not first and foremost entities independent of organisms that have objective physical characteristics that can be *seen*. Rather, "things are objects to be treated, used, acted upon and with, enjoyed and endured, even more than things to be known. They are things *had* before they are things cognized" (Dewey, 1925, p. 21).

The stories in out books are therefore not to be read as a prescription for good practice, but rather as an attempt to illuminate practices related to doctoral training in general and writing in particular, some of these highly planned and orderly, others messy and odd. In doing so, the intention is to get closer to the actual practices of doctoral training and writing than many "how-to" books ever come. In their review of doctoral advice books as a genre, Kamler and Thomson (2008) found that they frequently produce and reproduce expert–novice power relations that are too often the norm in many universities. We suggest that a peer-to-peer methodology is one way to constructively work with and work around these power relations instead of reproducing them.

Although we advocate a no-recipe approach, we can distil certain characteristics of a creative peer-to-peer methodology:

1. Invitation: the first invitation to co-write is likely to come from the supervisor or the more experienced peer. However, a quick return with a new invitation from the novice will even out the hierarchy, provide for mutual engagement and create a space for social creativity that may also involve others.
2. Reciprocity: the practice of exchanging ideas with each other evolves by will and by lucky accidents. As the collaboration proves productiveness, it becomes a habit to scan for new possible project of mutual benefit.
3. Viability: the first and the second collaborative writing project are testbeds to answer the question: can we write together? If the partnership turns out to be relatively smooth, rewarding and fun, new writing ideas tend to queue up.
4. Swiftness: when the writing project sets off, it is imperative to know that the other one is 'there'. This means quick responses with an elaborated version of the text. While one is writing, the other can take a well-deserved break from the text confident that is will return revitalized.
5. Tangibility: ideas and directions are suggested not by means of commentaries, but as tangible new text bites. Here, the old writing advice holds true: Show, don't tell. We do the work ourselves and show our ideas in writing, not (indirectly) asking our peer to carry it out for us.
6. Inclusion: harsh revisions can wait and give way for elaborations and additions. Receiving a new version of the text with extensive deletions of what one produced just a few days ago, playfully or sweaty, is always a bit intimidating. If the collaboration is new, it is often more than a bit. Keep writing. Defer deletions. There is a right time to narrow the text down and it is sometimes later than expected.

7. Transaction: every writer has preferred vocabularies, sentence constructs, metaphors and tics that flow into the shared pool of textual building block. Budding scholars can steal with impunity from their more experienced co-writer because, in the end, no reader can decipher who wrote what. As the collaboration matures, we ourselves cannot decipher who wrote what. We have created a subset from which creativity emerges, not originating from or belonging to one or the other.

Two-fold co-production

The creative peer-to-peer methodology thus became our tool for advocating a dynamic interpretation of doctoral training and supervisory relations. Through this two-fold ambition, developing practice and developing methodology, we are seeking to reduce the possibly counterproductive effects of power relations in research and address expert–novice relationships in the broadest sense. We involve in reflections with each other, with invited colleagues, and with the literature and thus stress a social notion of creativity that opens the door to an abundance of resources available for both students and supervisors. Master–student relationships are potentially everywhere. What we must do is to seek them out, try them out, and craft them in creative ways. Thus, what we are involved in and offering our readers are not just survival kits but also kits for adapting or keeping an adventurous mindset together. This involves mutual engagement as explicated in the following.

Same Same, but Different

In one of the most entertaining books about academic life and writing, *Writing for Social Scientists*, Howard Becker's (2007) shares the story of how a former doctoral student challenged him to be explicit about writing advice. His student, now a cherished colleague, enters his office with her draft filled with his deletions and simplifications, furious. She agrees with him that certainly she could write shorter and clearer: however, she prefers to write the way she does because it sounds *classier*. Taking note of the word "classy," Becker elaborates: "None of these classy locutions mean anything different from the simpler word they replace. They work ceremonially, not semantically. Writing in a classy way to sound smart means writing to sound like, maybe even be, a certain kind of person" (Becker, 1986/2007, p. 31).

He sums up, initially about doctoral students but then admitting that this applies to researchers in general:

> They know plain English but don't want to use it to express their hard-earned knowledge. Remember the student who said: "Gee, Howie, if you say it that way it sounds like something anyone could say." If you want to convince yourself that the time and effort spent getting your degree are worth it, that you are changing in some way that will change your way, then you want to look different from everyone else, not the same. (Becker, 1986/2007, p. 41)

The paradox here is that when trying to be different, in the sense of differentiating oneself from lay people through avoiding lay language, we only involve in what he terms a "truly crazy cycle" of repeating "the worst stylistic excesses" thus providing "the raw material for another generation to learn bad habits from" (Becker, 1986/2007, p. 41). Knowing the conventions are necessary to be able to become part of a social practice and learning from advisers is an effective way of decoding the conventions. However, as Becker points out here, some conventions—such as "classy" writing—need to be challenged.

As Becker's story shows, the supervisory relationship as an activity involving mutual investment and joint agency. Supervision is not just something the supervisor *gives* and the doctoral student *receives* but something that recognizes student agency as being of major significance. Supervision involves both issues of production, texts, and issues of process: the student's socialization into a research community, lifelong learning, and identity formation (Goode, 2010).

Research and especially doctoral research is an ever-balancing act of complying and experimenting. To succeed in a research community, we need our texts to be accepted, even read and praised, and we also need to grow and strive as creative human beings. Weighty compliance kills joy and faith in our own ability to make a mark in the world. Weighty experiment may be a worthy detour, yet, we need to convey our experimentation in ways accessible to others. In an interview study, (Brodin, 2014) shows that doctoral students experience tensions between critical and creative thinking and note that critical thinking often overshadows creative thinking with the consequence that many students develop a defensive research approach at the expense of an open and independent mind. Creative thinking is often linked to student independency. However, in another publication from the same research project, (Brodin & Avery, 2014) found that some supervisors expressed their concern about an excessive degree of independence in the students' composition of interdisciplinary research projects combined with insufficient disciplinary knowledge. The authors note that this, in the best case, could lead to original and innovative thinking, while in the worst case it could lead to reinventing

the wheel. Thus, both structure and freedom is required and too much independence is not always conducive to doctoral students' creative development.

Despite this concern, (Brodin, 2016) concludes that the challenge remains how to encourage doctoral students' creative thinking, since this crucial question is generally missing in doctoral pedagogy. Small creative acts are beneficial for nurturing an open and independent mind as well as knowledge creation and identity formation. Supervisors might thus consider in what ways creative thinking and acting can be encouraged *within* new knowledge development and pragmatic action. From this point, finding out whom we are as researchers can be nurtured by a mutual investment in peer-to-peer writing practices in which conventions are learned and challenged. The most experienced part knows the rules and the novice gets to know them by complying and practicing. The experienced part may be challenged to reflect and be explicit as Becker's story illustrates, and thus become more conscious about likable and disposable conventions—and better at explaining why. However, learning and practicing conventions should equally allow for experiment. Our survival kits aim to support the supervisor who wants to create such transparency by deliberately constructing occasions and assignments that allow the student to practice key tasks. Additionally, they aim to support the student who wants to co-create learning opportunities and advocate an organizational approach to learning and creativity, which avoids the unintended consequences of pairing a student with a single adviser. As such, a sound collaborative process is not just a matter of "good chemistry" between supervisor and student, but of providing access to the real practice of conducting research, inviting in, opening up the field, and thereby providing direction as well as keeping the relationship fluid and flexible.

Advantages, Pitfalls and Ideas for Further Meta-reflections

In our work, the peer-to-peer methodology served (and still serves) two purposes. (1) It gave us access to real-life stories about supervisory relations and (2) it spurred our interest in various forms of collaboration in research. Regarding the first aspect related to real-life stories, it is interesting that it is not always elicited verbally what is required to write and get published. This kind of knowledge is often, detached from the actual everyday process of writing and trying to publish. It lies in the activity itself and is sometimes seen more clearly and precisely by both supervisor and student when they engage

in the activity together. Additionally, there is undoubtedly an interest from both parties in getting the work done, as both are dependent on publishing their work. In this light, co-writing and sharing stories through a peer-to-peer methodology must be seen as a mutual investment and, accordingly, yielding mutually benefits.

Students and colleagues serve as data-providers and publishing motors, and students who really learn the craft contribute to more publications, both while learning and over the longer term. This shared understanding creates a no-nonsense alignment and common purpose, which allows the supervisor to be quite explicit about production expectations and at the same time allow the student a fair amount of the supervisor's time and attention. The student gets the opportunity to decode academic writing conventions while reading the supervisory contribution, and at the same time, she is on her own to practice and thus has the opportunity to become a critical, creative researcher. She does not have to worry that she might "put her foot in it," as she can leave the initial assessment of her ideas and writing style to the supervisor. Gradually, she gains increased knowledge on how to operate in terms of publishing discourses. Her own judgments are thus not critical in this phase, because the supervisor acts as a gatekeeper:

The term *first-cut publisher* evokes an understanding of the supervisor as a critical mediator and representative of the broader scholarly community, embodying its conventions, reading the text to help it stand up in the international arena. Again, it is the supervisor who keeps the student in the game (Kamler, 2008, p. 290). Accordingly, studies have shown that co-authorship with supervisors is significant in developing a profile for student writing in both education and science research communities. It is co-authorship that produces internationally refereed publications—without it, they would not occur (Kamler, 2008, p. 292). Co-authorship helps students progressing through the struggles and anxieties of publishing and shares the experience of acceptance or rejection. This fosters the student's ability to cope and be robust within the social practice of academic work. As our own co-authorship narrative illustrate (Wegener & Tanggaard, 2013a), the supervisor serves as an accomplice during the review processes, and despite the fact that reviewers' comments might sound harsh, the student is not alone in receiving them, decoding them, and returning to the manuscript and revising in order to meet the requirements.

There are both advantages and potential pitfalls integral to co-writing processes. What works well in our case might be dysfunctional in others. Although a dominant practice within the sciences, this kind of guidance has been perceived negatively, particularly in the field of education, for ethical reasons

regarding questions of ownership, autonomy, and self-exploration (Kamler, 2008, p. 285). These reservations should, of course, be taken into consideration during a co-writing process, as well as in all other activities that fall within doctoral supervision and novices learning from experienced colleagues by means of shared production of text. Collaboration always involves power dynamics, and when the collaborators have uneven access to power it may be even more important to keep the question of power and ethics in mind and for the supervisor to act accordingly. The student might not feel safe enough or be too focused on doing well in academia to express feelings of being overruled. Thus, we believe that the supervisor has the power and even an obligation to continually become involved in and build on the students' ideas during a co-writing process. Co-writing can take different forms; it can result in being one 'tight' product with a shared angle on the research problem, or it can take dialogical forms in which parts of or the whole text presents two or more perspectives on a common problem or question. From this perspective, what is often neglected in reservations towards co-authorship seems to be the sharing and building of power inherent to a co-writing process. From peer-to-peer perspective, the power of production and the sharing of a goal (and not goals invented by the supervisor to construct artificial milestones for the student) somewhat evens out the power balance. Doctoral writers need to learn how to adopt an authoritative stance in a field of "expert others," and to assert their contribution to that field before they feel authoritative themselves (Kamler, 2008, p. 286). Co-authoring supports this process by lending power to the student—power that empowers the student subsequently, or simultaneously, to work toward publishing alone and with peers.

Conclusion

A creative peer-to-peer methodology goes beyond an approach to doctoral training focusing on skills development alone (Barnacle & Dall'Alba, 2014). By exploring our own and others' learning processes, we engage productively with writing and the joys, fears and uncertainty it involves. Through co-writing it becomes obvious that researchers—doctoral students and professors alike—are all involved in both skills building and identify formation, although the learning trajectories play out in a variety of ways. What is common is our need to learn not just from instruction but also from stories. The peer-to-peer learning perspective sheds light on how the process of writing and getting published is a way of gaining access and entering into the academic community. This is a process of both learning the craft and developing researcher identity

and authority. From this point onwards, co-writing is likely to yield a steep learning curve for the student, enhance the effectiveness of the time spent on supervision, and produce a research article of high quality. It would be both interesting and instructive for future doctoral supervisors, students, and doctoral program providers to produce and have access to more research that delves into the dynamics of co-writing and way in which social creativity is allowed and nurtured. Data for such research could take the form of students and supervisors keeping diaries, interview studies, or retrospectively reviewing published co-authored papers, in order to identify and analyze patterns within student-supervisor interaction. In our everyday life as researchers, we can actively invest in the creation of spaces for social production of text and inquire into the creativity these spaces allow for and produce. This involves a continuous meta-perspective on our own practices as we experiment with new co-writing modes and seek to include newcomers and oldtimers in creative peer-to-peer production.

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33

Creativity and the Social Brain

Anna Abraham

The neuroscientific approach to investigating creativity refers to the study of brain basis of the mental operations that underlie creative ideation (Abraham, 2018b; Jung & Vartanian, 2018). The creative brain has been the subject of concerted investigations for a few decades now, and there are several consistencies in the patterns of findings that are reported regardless of whether one adopts a 'global' or a 'local' approach. Global approaches focus on large-scale brain networks when interpreting the brain correlates of creativity, whereas the spotlight in local approaches is far more circumscribed in that it is limited to local brain regions or brain activity patterns (Abraham, 2018a).

It is clear now that there is no single brain region or brain network that is purely specialized for creative cognition. While the functional roles and dynamics of the array of brain regions and brain networks that are implicated in creative ideation are slowly becoming clearer, most insights from brain research remain at the level of mere description. Few scholars attempt to infer beyond surface activity patterns to consider what these patterns reveal about the fundamental nature of mental operations applied to the context of creativity. If the brain areas involved in creative cognition overlap with those of normative cognition, this requires considering not only the differences but also the similarities between creative and non-creative aspects of cognition.

Let's take the example of the global brain networks perspective, the currently influential trend in creative neurocognition. Abundant evidence has shown the contribution of regions within the default mode network (DMN)

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and the central executive network (CEN) in orchestrating creative cognition (e.g., Abraham et al., 2012; Beaty, Benedek, Kaufman, & Silvia, 2015; Ellamil, Dobson, Beeman, & Christoff, 2012; Limb & Braun, 2008). In general terms, these brain networks are distinguished in terms of their functional profiles. The DMN is called upon in contexts of internal mentation, whereas the CEN is engaged in contexts that necessitate cognitive control in goal-directed thought and action. These two networks are normally anticorrelated (Fox et al., 2005), which means that when one is highly engaged or more active the other one is relatively inactive. A third network of the brain, the Salience Network (SN), which is primed to detect behaviourally relevant stimuli, largely determines which of these two networks will be engaged at any given time depending on what is necessitated by the currently relevant context. So the SN modulates the switch between the DMN and CEN, such that it triggers the CEN when external goal-directed processing is required and, alternatively, the DMN when a situation calls for internal spontaneous processing. What do we know so far about the functions of these networks?

The CEN is engaged during goal-directed tasks that require executive function and cognitive control, such as working memory, inhibitory control, task switching, controlled semantic retrieval, problem solving and reasoning (Cole & Schneider, 2007; Niendam et al., 2012). The anterior and lateral prefrontal cortices of this network occupy central focus in the context of creativity as they are involved during analogical reasoning, conceptual expansion, lyrical improvisation, metaphor processing, musical improvisation, problem solving and story generation (Abraham et al., 2012; Fink et al., 2009; Green, Kraemer, Fugelsang, Gray, & Dunbar, 2012; Kröger et al., 2012; Limb & Braun, 2008; Liu et al., 2012; Rutter, Kröger, Stark, et al., 2012b; Shah et al., 2011; Vartanian, 2012).

The DMN, in contrast, is strongly engaged during rest, and includes medial regions of the prefrontal cortex (Buckner, Andrews-Hanna, & Schacter, 2008; Raichle, 2015). The functional profile of this network is such that these regions are engaged during different types of social and self-referential imaginative thought processes. These include autobiographical and episodic memory (e.g., remembering my last day as a student at university), episodic future thinking (e.g., imagining what my next house will be like), mental state reasoning or theory of mind (e.g., making inferences about what my date is thinking), self-referential thinking (e.g., reflecting on my own behavior earlier that day), and moral reasoning (e.g., judging the permissibility of my boss's behavior). These operations can be either directly prompted (i.e., within a study using experimental design to assess the same) or spontaneously elicited under at rest and when performing cognitively undemanding tasks during

which mind-wandering inadvertently takes place (Andrews-Hanna, Reidler, Huang, & Buckner, 2010).

The core brain regions within the SN (Goulden et al., 2014) include the dorsal anterior cingulate cortex and the orbital frontoinsular cortices (Uddin, 2015) of which the latter mediates "dynamic interactions between other large-scale brain networks involved in externally oriented attention and internally oriented or self-related cognition" (Menon & Uddin, 2010). The insula is characterized by its sensitivity to bottom-up salience which account for how it determines when to switch between engaging the DMN or the CEN. Recent work using brain functional connectivity analyses has shown that hub regions across all three networks – DMN, CEN and SN – are implicated in relation to high levels of creative ideation (Beaty et al., 2018).

So where does this evidence take us? In a bid to uncover the differences between creative and non-creative cognition, we have fundamentally ignored the need to consider the similarities between them. The rest of this chapter is devoted to showcasing the advantage of following this novel approach by exploring the candidate mechanisms of correspondences between creativity and social behaviour. The three that will be described include the 'drive to understand', the 'intention to communicate or evoke', and the 'personal relevance bias'.

The Drive to Understand (by Means of Inference and Discovery)

The human brain is increasingly being understood and portrayed as an engine of predictive and proactive processing (Bar, 2009; Bubic, von Cramon, & Schubotz, 2010; Clark, 2013). Through our sense organs we are constantly statistically sampling the information in our environments and form expectations based on context-specific consistencies. This is a rapid and dynamic process and one that is optimized for efficiency, which is why we experience our perceptual world to be smooth and continuous. Indeed, if we attended to every single stimulus in our environment as though it were an entirely new stimulus with no contextual connection to any previously experienced stimulus, we would be incapable of functioning in the usual rapid and efficient manner as the information processing demands would be perpetually overwhelming. Under such circumstances, accuracy in stimulus processing would be very high but we would necessarily be very slow in moving through our environments.

One of the ideas for the types of algorithms that might be applicable in generating quick and efficient processing, which generates the ability to engage with the environment to a sufficiently high level but not perfect of accuracy, was postulated by Daniel Dennett. He proposed that the brain uses three mental shortcuts to categorise events that we experience (Dennett, 1987). The 'physical stance' is applied when an event can be understood by means of the natural forces in the world (e.g., A ball that is thrown up will fall down to the floor). The 'design stance' applies when an event can be explained with reference to the manner in which stimuli in that context are designed for a specific function (e.g., A ball that emits flashing lights whenever it is bounced on the floor has been designed to do through an engineered connection between pressure and light). Events that cannot be explained through either the physical stance or the design stance are viewed through the lens of the 'intentional stance' where the events are interpreted as intentional or goal-directed (e.g., A ball that is thrown up suddenly stops falling to the ground and instead lingers in the air and moves around erratically).

The DMN has been characterized as priming the intentional stance (Spunt, Meyer, & Lieberman, 2015), as it is often involved in when inferring the mental states of others. Inference generation is a key component of mental state reasoning as one is not privy to the contents of another person's mind. Mental state reasoning, also commonly referred to as mentalizing or theory of mind, together with other operations that engage the DMN such as episodic memory, episodic future thinking, self referential processing and moral cognition, has been classified as falling into the category of 'intentionality-based imagination' as it elicits information processing mechanisms that are "predominantly recollective in nature with a view to establishing the best possible explanation of a situation or event in question. This is brought about by means of spontaneous access to an extensive and diverse repertoire of relevant knowledge when processing such contexts. The best or most plausible explanation is the one that fits best with what is already known in terms of oneself and/or one's worldview" (Abraham, 2016: 4203).

A key point to note though is that while the DMN regions are strongly engaged in these contexts of social and self-based cognition, they are also involved in contexts that are not explicitly social or self-based, but still call upon or necessitate similar computational demands. The dorsal aspect of the medial prefrontal cortex, for instance, is involved in inference generation across contexts – discourse processing, humour, etc. – regardless of the sociality of the background context (Ferstl & von Cramon, 2001, 2002;

Siebörger, Ferstl, & von Cramon, 2007). So the discovery of coherence within a context that comes about by making an associative or inferential leap (between two statements, for instance) leads to heightened activity in this core DMN region regardless of whether it involved non-mental state reasoning (e.g., The lights have been on since last night. The car doesn't start.) or mental state reasoning (e.g., Mary's exam was about to begin. Her palms were sweaty.).

A further example of where a similar case can be made is that of another core DMN region – the temporal poles. This region, which forms the anterior-most extent of the left and right temporal lobe, is held to be critical in the representation and retrieval of social script knowledge (Olson, McCoy, Klobusicky, & Ross, 2013; Wang et al., 2017). From the context of mental state reasoning, this region is held to be a repository of sorts for social script knowledge that we draw on to generate inferences during social cognition (Frith, 2007; Frith & Frith, 2006; Saxe, Carey, & Kanwisher, 2004). What is fascinating is that abundant literature within the field of semantic cognition show that the temporal poles are the hub zone where conceptual knowledge seems to be stored amodally and/or multimodally (Fairhall & Caramazza, 2013; Jefferies, 2013; Patterson, Nestor, & Rogers, 2007). So the temporal poles house abstract, amodal and multimodal representations of conceptual knowledge, regardless of whether the information is categorized social or non-social. The key attribute to not focus on here is which type of information activates this region 'more', as this essentially reflects some core facet of the information that is being processed to a greater degree. If one introspects on the difference in one's conscious experience of social information (e.g., one's boss, the face of a stranger, an interview with Tilda Swinton) versus non-social information (e.g., a menu card, the sound of a the rain, the smell of a department store), it should be fairly obvious that social information encoded in a manner that is more amodal or multimodal and more highly associative per se than non-social information. This could be the reason why social information processing engages the temporal poles more than non-social information processing. However, the fact that all types of conceptual knowledge evoke activity in this region begs us to consider what is the common denominator. And the answer is that this region is not engaged when processing unimodal or modality-specific information, but instead when processing abstract, amodal and multimodal information. So the ability to infer and discover new associative connections within one's conceptual space is necessarily incumbent on being able to draw upon this form of representation.

The Intention to Communicate and Evoke (by Means of Expression)

Let us think for a moment about why we create. It is clear that human beings are an extraordinarily creative species. Although the term 'creativity' is typically associated with prominence and productivity in the arts as well as invention and discoveries in the sciences, it is in fact central to virtually all domains of human life, including industry, policy-making, services and community development, as creativity is the foundation from which innovation and progress emerges (Sawyer, 2012). This is to be expected given that the need to be creative is typically viewed as central to the human self-actualization drive (Maslow, 1943), which refers to the need that each of us have to realize our unique potential in the form of distinctive achievements and personal growth throughout our lives.

This drive to create is not given nearly enough focus in the literature despite the fact that its power is unmistakable. Let us take the example of *de novo* artistic skills. This refers to the sudden emergence of visual artistic and musical abilities in people who did not previously exhibit such tendencies following brain injury or neuronal degeneration (B. L. Miller et al., 1998; Z. A. Miller & Miller, 2013). This unexpected release of artistic behaviors is believed to reflect the drive to communicate and express oneself in the face of the inability to do so effectively due to language impairments that are symptomatic of such conditions (Zaidel, 2014). As the customary route of expression is thwarted in this context, the turning to art is viewed as an alternative means of personal expression for the purpose of communication. Indeed, the healing power of engaging with the arts, given that it allows for unique self-expression and promotes resilience, has been highlighted in relation to several clinical disorders, so much so that positive interventions in relation to the same are advocated in such contexts (Assael & Popovici-Wacks, 1989; Forgeard & Eichner, 2014; Forgeard & Elstein, 2014; McFadden & Basting, 2010).

What is more, creative expression does not occur in a vacuum, but within a social context. It is after all when our creations resonate with others that our ideas gain traction. In fact, the "set of social institutions, or field, that selects from the variations produced by individuals those that are worth preserving" is one of the three main shaping forces that determine the degree of creativity associated with an output (Csikszentmihalyi, 1988).

The response of others, both real and imagined, to the outputs of one's generativity is central to the process of creative ideation. Neuroscientific evidence does in fact indicate that we are highly tuned to the factors that facilitate

understanding of information being imparted in our social world. For instance, the N400 is a well-studied event-related potential (ERP) which indexes the detection of semantic and world knowledge violations (e.g., The colour of milk is orange) during language comprehension (Kutas & Federmeier, 2011; van Berkum, Hagoort, & Brown, 1999) and is of key relevance to creative cognition (Kröger et al., 2013; Rutter, Kröger, Hill, et al., 2012a). The sensitivity of the N400 also extends to social contexts as it is preferentially engaged when faced with culturally specific social norm violations (Mu, Kitayama, Han, & Gelfand, 2015) and is influenced by the knowledge of other listeners. For instance, participants who had knowledge about a language stimulus but knew that a co-listener could not know the same, showed a N400 response when listening to the stimulus with the co-listener but not when hearing the stimuli alone (Rueschemeyer, Gardner, & Stoner, 2015).

The fact that we are sensitive to the knowledge of others and our brain activity indicates selective responsivity for the same has powerful implications for understanding how a keen awareness of both our knowledge of others and our power to evoke emotional and behavioral responses in others shapes our ability to create products that have a deep resonance with others in our social space.

The Personal Relevance Bias (by Means of Alertness to Self-Related Salience)

The relevance of the DMN in the information processing of social and self-relevant information has been highlighted in a previous section. Several studies using a range of different paradigms have indicated that certain brain regions within this network, particularly ventral aspects of the medial prefrontal cortex, are particularly sensitive to the degree of self-relatedness or personal relevance of the information (Mitchell, Macrae, & Banaji, 2006; Murray, Schaer, & Debbané, 2012; Northoff et al., 2006; van der Meer, Costafreda, Aleman, & David, 2010). This means that the greater the degree of similarity of the information being processed is to oneself, the higher the activity in these specific brain regions. The paradigms in these cases typically entail the evaluation of entities, i.e., people who are similar to oneself in terms of physical attributes, personality characteristics, filial association, political leaning, and so on. However, the bias towards self-similarity applies beyond explicit entity-based contexts (Abraham, 2013). It need not involve explicit evaluations of people, and the contexts need not involve living beings at all. Indeed,

one characterization of the ventral medial prefrontal cortex held that this region mediates the "identification and appraisal of stimulus-induced self relevance" (Schmitz & Johnson, 2006).

An impressive example of a study that showed the activity of this region in contexts that neither involved real entities nor necessitated explicit evaluative judgments was one that involved simple and neutral geometric forms such as a two-dimensional circle (Sui, Rotshtein, & Humphreys, 2013). Participants tagged forms with labels for themselves, their best friend, and an unfamiliar other. Self-tagged responses were associated with greater engagement of the ventral medial prefrontal cortex and faster response speed. This finding of advantageous in information processing even in contexts of arbitrary and transitory self-object associations indicate that personal significance is automatically encoded in the brain and our information processing is modulated by the same (Roye, Jacobsen, & Schröger, 2007). We involuntarily orient and are alerted towards stimuli in the environment that are personally relevant. That the salience associated with personal relevance generalizes to contexts that are not explicitly socially or self-focused is the key point to note here. Topics, themes and ideas that drive our individual fascinations and passions have a deep personal significance for us. We are alert and aware to a heightened degree to anything in our environment that informs the interests of our minds, and in the case of the creative drive, this automatic attuning towards and gathering of this form of personally significant information influences our capacity for inventiveness and generativity.

Concluding Thoughts

It would be erroneous to regard the three aforementioned drives as mutually exclusive as they are fully interwoven capacities that dynamically influence one another. Delving into the literature on the social brain to seek correspondences between creative and social cognition allows one to derive much that is vital about the dynamics of creativity. The utility of this focus often goes unnoticed as most efforts are directed at outlining the differences between creative and non-creative cognition. Adopting this alternative approach of comprehending the nature of the commonalities between the same seems just as crucial to understanding how creativity emerges across contexts. The importance of considering the impact of one's social milieu cannot but be central to this process.

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34

Social Innovation and the Evolution of Creative, Sustainable Worldviews

Liane Gabora and Mike Unrau

Introduction

Sometimes it isn't until you take a step back from something and see it in context that you begin to understand it. When humans began to see Earth, not as the center of the universe, but as a planet revolving around our sun, a star, it catapulted us to a new level of understanding, and when we started seeing Earth from space as a pale blue dot we gained more perspective still. In this chapter we will take a step back from creativity and examine it in terms of the role it plays in fueling the evolution of culture.

When people interact with each other, directly through social exchange, or indirectly, by way of artifacts, we put our own spin on each others' ideas, adapting them to our own needs, tastes, and preferences. This not only generates cultural variation, it ensures that this variation is cumulative; my ideas build upon yours, and so forth, giving rise to a web of 'cultural lineages' extending through time and across space. The process is often *exaptive*: an object originally designed for one purpose may be redesigned to serve a different purpose (Gabora et al., 2013). So a first goal of this chapter is to take a step back from individual creative acts, and look at them as the novelty-generating component of an evolutionary process, the evolution of culture. A second goal of this chapter is to show how creativity and innovation can be applied to social situations to make them healthier and more effective.

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When Ideas Jump Ship: Cross-Domain Influence in Creativity

Let us start by looking at a fascinating phenomenon that arises in social creativity: the phenomenon wherein creative outputs in one domain inspire and influence creative outputs in another domain.

To see what makes this cultural phenomenon so intriguing, it is helpful to first compare it to its biological analog. In biological evolution, organisms must be members of the same species to mate, because they mate using instruction sets for how to build an organism like themselves—i.e., a self-assembly code—and their mate's self-assembly code must be compatible with theirs. (In biological organisms, self-assembly codes are made out of DNA, though in theory it could be made out of something else.) In cultural evolution, however, there is no self-assembly code; elements of culture rely on *us* to build them (Gabora, 2004, 2013). This means we can take two very different 'parent ideas', say, the idea of a beanbag, and the idea of a chair, and generate cultural novelty: a beanbag chair. Since neither a beanbag nor a chair replicates itself using a self-assembly code, the fact that they are very different did not thwart the beanbag chair invention process. This means that cultural lineages are highly subject to change.

In fact, ideas 'jump ship' regularly in all kinds of fascinating ways. For example, a study of cross-domain inspiration showed that it is possible to reinterpret a creative work in one medium into another medium. When painters were instructed to paint what a particular piece of music would 'look like' if it were a painting, naïve participants were able to correctly identify at significantly above chance which piece of music inspired which painting (Ranjan, Gabora, & O'Connor, 2013; Ranjan, 2014). Although the medium of expression was different, something of its essence remained sufficiently intact for people to detect a resemblance between the new creative output and its inspirational source. Thus, at their core, creative ideas are less domain-dependent than is widely assumed.

This conclusion received further support from another study, in which creative individuals in a variety of disciplines were asked to list as many influences on their creative work as they could (Gabora & Carbert, 2015). Of the 65 creative influences provided by the 66 participants, 47% were cross-domain influences (e.g., a painting influenced by music), 27% were narrow within-domain (e.g., a painting influenced by another painting), 8% broad within-domain (e.g., a painting influenced by sculpture), and 18% unclassifiable. This result surprised us, for we had just been looking to see if cross-domain

influence exists at all; we were not expecting it to predominate! However, another study involving 261 undergraduate psychology students (i.e., unlike the previous study they were not particularly creative) yielded even more startling results: of the 508 creative influences listed, 67% were cross-domain, 13% were broad within-domain, 13% were broad within-domain, and 7% unclassifiable (Scotney, Weissmeyer, & Gabora, 2018).

Of course, evidence for the creative blending and contamination of ideas is everywhere, from fusion cuisine to Donald Duck slippers to 'Windows' computers. However, what these results show is that even when the creative *output* is not a blend but lies squarely in one domain, the *creative process giving rise to it* may be rooted in different domains. Thus, creativity is not confined to the particular 'problem domain' of the eventual creative output, as is widely assumed; creators can probe the vast hinterlands of their realities to scout out ingredients for their creativity.

Creativity Fuels Cultural Evolution Through Cognitive Restructuring

At first glance it may seem that the basic units of cultural evolution would be such things as rituals or tools, but from the above evidence for the cross-fertilization of different domains, it seems the only way to delineate the 'conceptual parents' of a given idea is to look to the creator's entire web of knowledge and understandings. Not only could the hammer inspire another hammer design, it could inspire a song, or a Mickey Mouse cartoon. Thus, these findings set the stage for the framework for creativity proposed here, which is based on the argument that discrete elements of culture such as songs or stories are not what evolves through culture; they are the overt, observable manifestations of evolving cognitive structures (Gabora, 2004, 2008, 2013, 2017).

Indeed, it is widely thought that humans possess two levels of complex, adaptive, self-organizing, evolving structure: an organismic level and a psychological level (Barton, 1994; Combs, 1996; Freeman, 1991; Gabora, 1998, 2017; Pribram, 1994; Varela, Thompson, & Rosch, 1991). We can refer to this psychological level as a *worldview:* an individual's uniquely structured web of understanding that provides both a way of seeing the world and a way of being in the world, i.e., a mind as it is experienced from the inside. Thus, it is the worldview that is evolving through culture. It is the *self-organizing* nature of a worldview—i.e., the fact that it can continuously renew itself—that makes it impossible to trace all the influences or

"conceptual parents" of a creative work such as a song or journal article. For example, consider the situation in which a video game inspires a song, which inspires a book. To see the thread of continuity across this "line of descent" it is necessary to consider how their creators navigate through webs of beliefs, attitudes, procedural and declarative knowledge, and habitual patterns of thought and action that emerge through the interaction between personality and experience.

The loosely integrated structure of a worldview enables us to detect gaps, inconsistencies, or problems, focus our attention on them, and reweave our conceptual webs to better understand or accept the situation, and find a solution, or at least a way of expressing our reaction. Honing an idea involves looking at it from the different angles proffered by one's particular worldview, 'putting ones' own spin on it', make sense of it in one's own terms, and expressing it outwardly (Gabora, 2017). It may involve the restructuring of representations by re-encoding a problem such that new elements are perceived to be relevant, or relaxing goal constraints (Weisberg, 1995). Thus, honing enables the creator's understanding of the problem or task to shift, and in so doing it may find a form that fits better with the worldview as a whole. In this way, not only does the task get completed (or worked on and put aside) but the worldview transforms, becomes more robust, and evolves. The transformative impact of immersion in the creative process extends far beyond the "problem domain"; it can bring about sweeping changes to that second (psychological) level of complex, adaptive structure that alter one's self-concept and view of the world. Creative acts and products render such cognitive transformation culturally transmissible. Thus, it is suggested that what evolves through culture is not creative contributions but worldviews, and cultural contributions give hints about the worldviews that generate them.

Although selection as the term is used in the layperson sense may play a role (people may be selective about which aspects of their worldviews they express, for example, or which paintings they show at a gallery), the cultural evolution process does not involve selection in its technical sense (change over generations due to the effect of differential selection on the distribution of heritable variation across a population). We posit that instead of search, creativity involves viewing the task from a new context, which may restructure the internal conception of it, and this restructuring may be amenable to external expression. This external change may in turn suggest a new context, and so forth recursively, until the task is complete.

A worldview not only self-organizes in response to perturbations but it is imperfectly reconstituted and passed down through culture. This is because it is not just self-organizing but *self-regenerating:* people share experiences, ideas,

and attitudes with each other, thereby influencing the process by which other worldviews form and transform. Children expose elements of what was originally an adult's worldview to different experiences, different bodily constraints, and thereby forge unique internal models of the relationship between self and world. Thus, worldviews evolve by interleaving (1) internal interactions amongst their parts, and (2) external interactions with others. Through these social interactions, novelty accumulates and culture evolves. Elements of culture create niches for one another. One creative ideas begets another and modifications build on each other. This phenomenon, wherein there is an accretion of cumulative change over time, is sometimes referred to as the *ratchet effect* (Tomasello, Kruger, & Ratner, 1993).

An Agent-Based Model of the Interplay of Creativity and Imitation in Cultural Evolution

EVOC (for EVOlution of Culture) consists of neural network based agents that invent new actions and imitate actions performed by neighbors (Gabora, 1995, 2008). The core of each agent is a simple neural network: an information processing unit inspired by how brains work, which can learn and generate ideas for different cultural outputs. For EVOC agents, the cultural outputs are actions, which get implemented as different combinations of movement across body parts. Although an agent is infinitely simpler than a human, its ideas (for actions) are integrated in the sense that they are encoded in overlapping distributions of 'neuron-like' interconnected nodes. Through the interplay of creatively building on existing ideas, and imitating what a neighbor is doing, the agents' cultural outputs evolve, i.e., exhibit cumulative, adaptive, open-ended change over time. Thus, the assemblage of ideas changes over time not because some replicate at the expense of others, as in natural selection, but through inventive and social processes. Agents can learn generalizations concerning what kinds of actions are useful, or have high 'fitness' with respect to a particular goal, and use this acquired knowledge to guide their creativity. A model such as EVOC is a vast simplification, and results obtained with it may or may not have direct bearing on complex human societies, but it allows us to vary one parameter while holding others constant and thereby test hypotheses that could otherwise not be tested. It provides new ways to think about and understand what is going on.

EVOC exhibits typical evolutionary patterns, such as (1) an increase in the fitness and complexity of cultural outputs over time, and (2) an increase in diversity as the space of possibilities is explored followed by a decrease as agents converge

on the fittest possibilities, as illustrated in Fig. 34.1. It has been used to model how the mean fitness and diversity of cultural outputs is affected by factors such as population size and density, and borders between populations (Gabora, 1995, 2008), as well as the questions reported here pertaining to creativity.

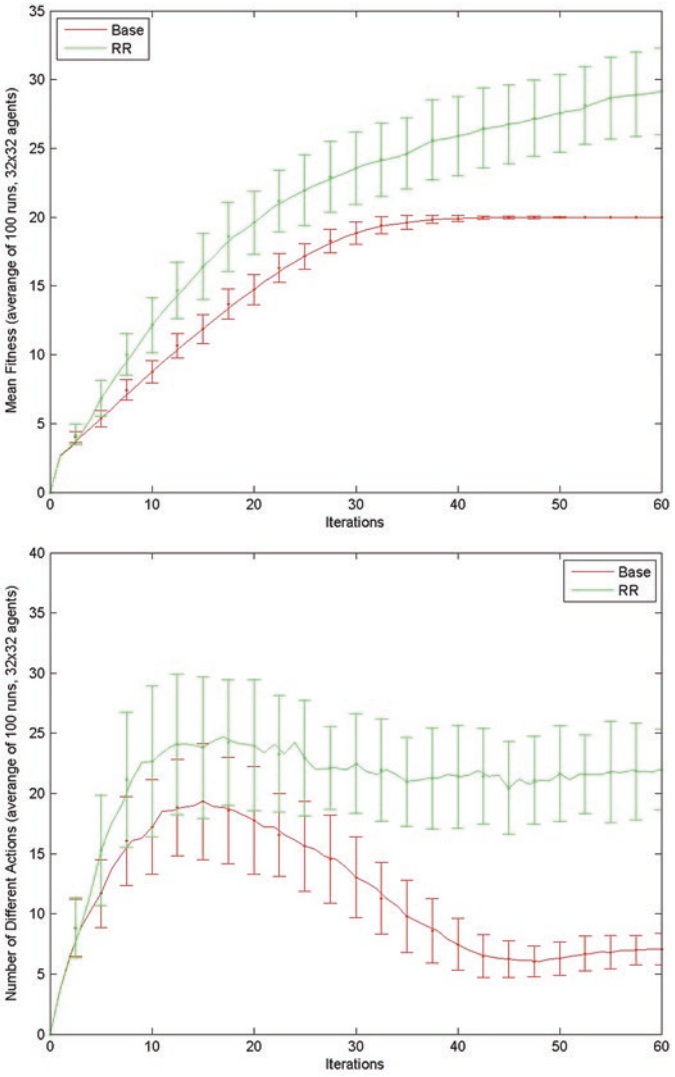

Fig. 34.1 A typical graph of the increase in fitness of cultural outputs over time (top), and increase in diversity as the space of possibilities is being explored followed by a decline as the society converges on the fittest (bottom). These graphs also demonstrate the effect on fitness and diversity of a closed (labeled 'Base') versus open-ended (labeled 'RR', for 'representational redescription') space of possibilities.

Balancing Creativity with Continuity

Evolution—whether it be biological or cultural—combines processes that promote change with processes that promote continuity; in other words, it involves not just *generating* new possibilities, but *preserving* the best of them. It often also involves *building on* existing possibilities, which combines both generation and preservation. The point is: an evolutionary process is as much about holding onto stuff that works as coming up with new stuff. What this means for cultural evolution is that it isn't necessary for everyone to be creative for the benefits of creativity to be felt by all. Few of us can build a jet or sculpt a masterpiece, but they are nevertheless ours to use and enjoy. We can reap the rewards of a creative person's ideas by copying them, buying them, or just admiring them. When we kick back with a tub of Ben & Jerry's and binge-watch a season of Game of Thrones instead of working on a novel, it may not feel like we're contributing to cultural evolution, but we're absorbing all kinds of things about our culture—social norms and deviations from them, styles of fashion, diction, and so forth—that may in turn reveal themselves in our future interactions. It doesn't necessarily pay to be creative. While creative individuals generate the novelty that fuels cultural evolution, absorption in their creative process may impede the diffusion of proven solutions, effectively rupturing the fabric of society. This leads to the question: how creative should a society be? How much is too much?

These are difficult questions to address in studies with real people, but it is possible to address them in EVOC. In a first experiment, all agents could both invent and imitate, and whether they invented or imitated on a given iteration was a probabilistic function of the invention-to-imitation ratio, which was varied systematically from 0 to 1 (Gabora, 1995). When agents never invented, there was nothing to imitate, so there was no cultural evolution at all. If the ratio of invention to imitation was just marginally greater than 0, not only was cumulative cultural evolution possible, but all agents eventually converged on optimal cultural outputs. When all agents only invented and never imitated, the mean fitness of cultural outputs was also sub-optimal because fit ideas were not diffusing through the artificial society, but cultural evolution took place nevertheless. Figure 34.2a and b show the impact over time of different ratios of inventing to imitating on the mean fitness and diversity, respectively, of cultural outputs across the artificial society. The society as a whole performed optimally with a mixture of inventing and imitating, the optimal ratio being approximately 1:1, with the exact value depending on the fitness function (i.e., the problem they had to solve); for example, with the difficult fitness function used to generate Fig. 34.2, it was significantly lower than 1:1. Unlike fitness, diversity of outputs was positively

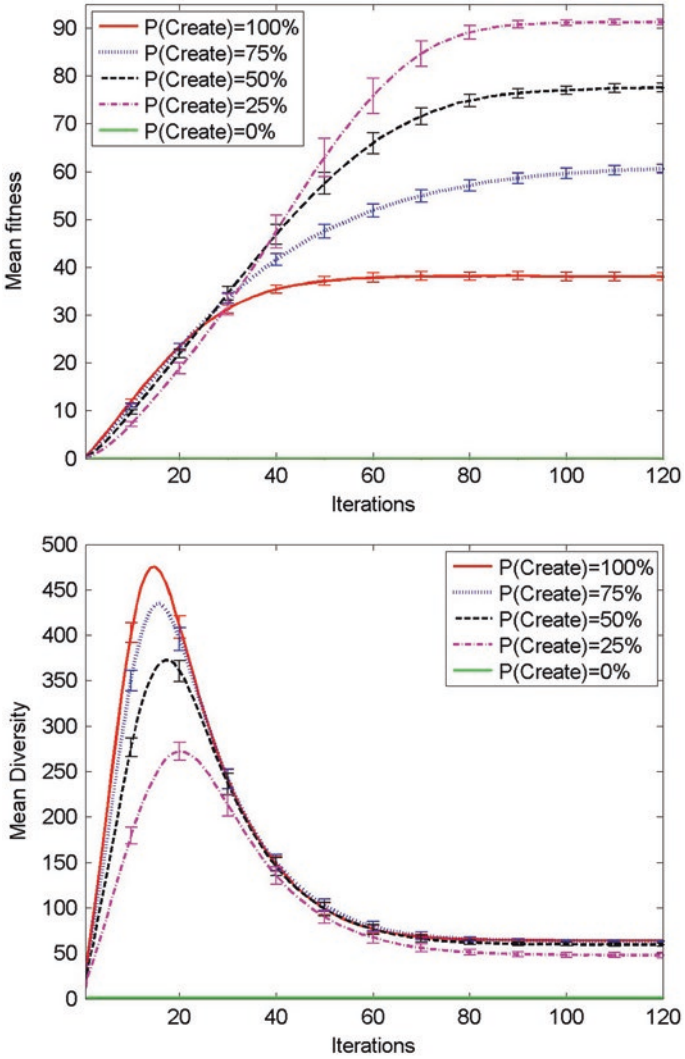

Fig. 34.2 Fitness (top) and diversity (bottom) of cultural outputs with different of invention to imitation ratios

correlated with the ratio of creation to imitation, which makes sense, since creation resulted in new variants. These results supported the hypothesis that, as in biological evolution, culture evolves most effectively when novelty-generating processes (e.g., creativity) are tempered by continuity fostering processes (e.g., imitation).

This finding that very high levels of creativity could be detrimental to society as a whole led to another hypothesis, which has to do with evidence compiled by (Florida, 2002) that individuals in a society naturally settle into two

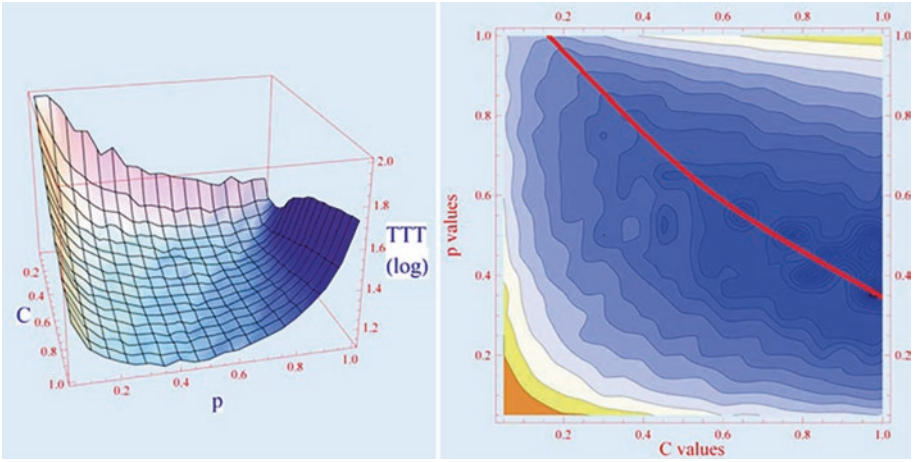

Fig. 34.3 The effect of varying the percentage of creators, *C*, and how creative they are, *p*, on mean fitness of ideas in EVOC. 3D graph (left) and contour plot (right) for the average mean fitness with different values of *C* and *p*. Since the z-axis is reversed to obtain an unobstructed view of surface, lower values indicate higher mean fitness. The red line on the contour plot indicates a clear ridge in fitness landscape indicating optimal values of *C* and *p* that are sub-maximal for most {*C*, *p*} settings, *i.e.,* there is a tradeoff between how many creators there are and how creative they should be. (Adapted from Gabora & Firouzi, 2012)

streams: the conventional workforce, and what he called the 'creative class'. We hypothesized that this division of labor has adaptive value for society as a whole. This was investigated in EVOC by dividing the artificial society into two types of agents: *conformers* that only obtained new actions by imitating, and *creators* that obtained new actions either by inventing or imitating neighbors (Gabora & Tseng, 2017). Each agent was either a creator or an imitator throughout the entire run, and whether a creator invented or imitated in a given iteration fluctuated probabilistically. We systematically varied *C*, the proportion of creators to imitators in the society, and *p*, how creative the creators were. As illustrated in Fig. 34.3, there was a tradeoff between *C* and *p* such that the more creators there were, the less creative they should be, and vice versa. This provided a different kind of evidence that society as a whole functions optimally when creativity is tempered with continuity.

This led us to hypothesize that society as a whole might benefit when individuals adjust how creative they are according to the perceived value of their creative outputs (possibly mediated by feedback from others). This too was investigated in EVOC (Gabora & Tseng, 2014). First we investigated whether giving agents the ability to self-regulate their creativity did indeed increase the mean fitness of ideas in the artificial society. Self-regulation (SR) of creativity refers to the capacity to modify how creative one is, potentially on the basis of

external feedback from peers, but also potentially on the basis of hunches or intuitions about the potential of one's ideas. In EVOC, social regulation (SR) was implemented by enabling agents to increase their relative frequency of invention when they generated superior ideas, and decrease it when they generated inferior ideas. *p(C)* was initialized at 0.5 for both SR and non-SR societies. With SR turned on, the mean fitness of the cultural outputs was higher than without it. Figure 34.4 shows the impact of SR on the mean fitness (top) and diversity (bottom) of cultural outputs (Gabora & Tseng, 2014).

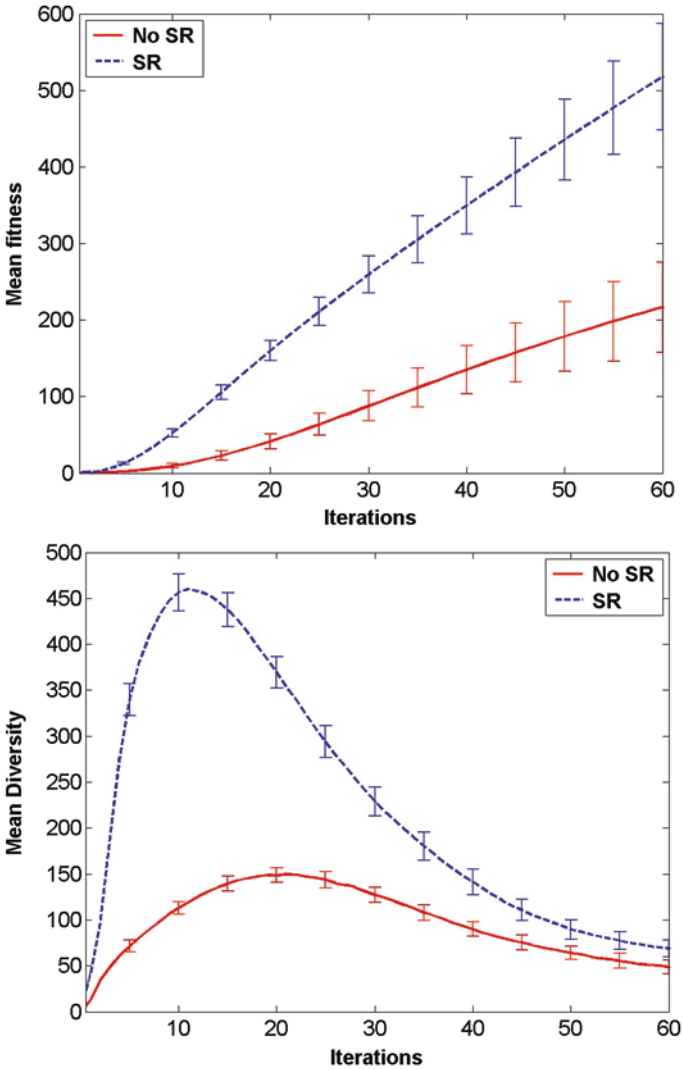

Fig. 34.4 Diversity of actions after 1, 5, 15, and 20 iterations, over individual runs with 0, 1, and 5 broadcasters. Different actions are represented by differently colored cells. (From Gabora, 2008)

Societies with SR segregated over time into two distinct groups: one that primarily invented, and one that primarily imitated. Thus, the increase in fitness could indeed be attributed to increasingly pronounced individual differences in their degree of creativity over the course of a run. Agents that generated superior cultural outputs had more opportunity to do so, and agents that generated inferior cultural outputs became more likely to use their iterations propagating other agents' ideas.

Impact of Media on Creative Cultural Evolution

Another question that can be addressed with EVOC is: what is the impact of media on the cultural evolution of novelty? It's only been for the most recent sliver of human evolution that, by way of television, film, and radio, we've all had direct and immediate access to the same specific people. In one moment, all eyes can *converge* on Johnny Carson. Even more recently, with the internet, Netflix, and so forth, there has been a *divergence* of attention; at any time we can indiviudally watch practically anything, or anyone, or even… Johnny Carson reruns.

The impact of media was investigated in EVOC using the *broadcasting* function (Gabora, 2008). Broadcasting allows a particular agent's actions to be accessed and imitated by not just immediate neighbors, but all agents. The broadcaster(s) can be selected or chosen at random before the run, or the user can specify that the agent with the fittest action is the broadcaster for that iteration. Adding one broadcaster produces a modest increase in the fitness of actions, but at the cost of greatly reduced diversity, since everyone starts doing what the broadcaster is doing. However, the more broadcasters there are, the less diversity is reduced.

We investigated the impact of broadcasting by comparing the diversity of actions in runs with zero, one, and five broadcasters. In each case there was the usual increase in diversity (as the space of possibilities is explored) followed by a decrease (as agents converge on the best actions). However, with the addition of a broadcaster, the total number of different actions after 20 iterations decreased from eight to five, and the percentage of agents executing the most popular action increased from 41\% to 84\%. Thus, broadcasting accentuates the normal plummet in diversity. However, as we went from one broadcaster to five, the total number of different actions after 20 iterations increased from five to nine, and the percentage of agents executing the most popular action decreased from 84\% to 31\%. Thus, although media

decreased diversity, this decrease in diversity was mitigated by more distributed media.

The effectiveness of creative versus uncreative broadcaster styles was also investigated in EVOC. Creative broadcasting increased the mean fitness of cultural outputs only when non-broadcasters were relatively uncreative, and increased the diversity of outputs only early in a run during initial exploration of the space of possibilities (Leijnen & Gabora, 2010).

Context, Perspective, and Point of View

We said that honing an idea involves 'putting ones' own spin on it', make sense of it in their own terms, and expressing how it looks from one's point of view. It can be useful to differentiate between context, perspective, and point of view. A *context* can be defined as a specific lens that can affect the applicability of descriptors or the typicality of instances of a concept (Aerts & Gabora, 2005). For example, a guppy is not generally considered a typical FISH, but it is considered a typical PET FISH; in this case PET is acting as a context for FISH. A *perspective* can incorporate multiple contexts; for example, one perspective might take into account durability and utility while another takes into account cost of raw materials and value of final product (Veloz, Temkin, & Gabora, 2012). Perspective helps us organize our experiences, filter them through the conceptual schemes of our minds (Scheopner, 2013; Anderson, 1998). A *point of view* can be defined as a perspective that is associated with a particular individual, or individuals, owing to the situation(s) they are in, or 'where they stand' on one or more issues. Point of view is influenced by culture, as well as by needs, interests, and values. Thus, like a perspective, it can accommodate multiple contexts.

An individual's point of view affects how he or she hones through an idea because it affects which contexts (i.e., which angles) the idea is considered from. Point of view can be affected by mulling an idea over with others, for as Anderson (1998) notes, "the more eyes, different eyes, we can use to observe one thing, the more complete will our 'concept' of the thing, our 'objectivity,' be" (p. 18).

Context, perspective, and point of view are inherently social, in that they are affected by social interaction; this is the basis for the impact of positive impact of social imitation in Figs. 34.2 and 34.3 above. This leads us to the topics of social creativity and social innovation.

Social Creativity and Social Innovation

When humans began to see the Earth as a whole planet from space, we also began to contextualize our relationship to it in terms of how we impact it (Szerszynski & Urry, 2006). The social exchange we have with one another and the resulting cultural contributions that come out of those exchanges drive increasingly complex worldviews, and in turn an increasingly complex array of cultural outputs as new ideas build upon previous ideas. For example, my creative process culminates in a cultural product, which you come across on the internet, and it inspires you to create something similar through your own cultural lens. Someone else discovers your version of the product by accident through social media, and is stimulated to put their own spin on it, which leads to another product, and so on. Thus the generative ideation process is highly social, in that social ties not only lead to novelty accumulation which evolves culture, but also pave the way for innovations that are socially inspired.

The term 'social creativity' refers to a type of creative process that involves one or more social 'layers'; in other words, it results from creative interactions amonst people, and can influence on social structures and networks. An example of social creativity might be a group of individual painters who decide to paint together in a social atmosphere and develop a particular 'style' that is considered innovative, which influences other artists. Social creativity can bring about social change and culminate in complex, multilevel social systems (Moradkhah & Alborzi, 2016; Amabile, 1983; Domingues, 2000; Watson, 2007*)*. To illustrate this using the above example, the painting group might receive escalating media attention, and start to take on social issues such as poverty in their art or discussions with media. It may be that not everyone agrees with their message, and the ensuing conflict encourages celebrities and politicians to get involved and support or reject the causes proposed, with their own creative adaptation or developments.

Innovation is related to creativity, but the term innovation tends to be used when there is a distinct breadth and/or scale of *impact* to the creative endeavor, when the impact tends to remain *resilient* over time, and when the *implementation* of the endeavor has discernable methods or outcomes (Caulier-Grice, Patrick, & Norman, 2012). *Social Innovation* refers to the development of new products, services and programs when applied within social structures to meet the needs and transformations that occur within the cultural collective to improve social conditions (Hämäläinen & Heiskala, 2007). It also refers to the outcomes of social interactions between innovators (Mumford, 2002),

and results in improvements to the quantity or quality of social life, defined less by novelty and more by consequences of implementation (Neumeier, 2012). Since social innovations arise to meet complex social problems, they often change the resources, routines, and belief structures of the system in which they arise (Westley & Antadze, 2010). A social innovation has resilience and broad impact, and thus is "system-changing: it permanently alters the perceptions, behaviour, and social structures that gave rise to these challenges. Simply put, a social innovation is an idea that works for the public good" (Caulier-Grice et al., 2012, p. 11).

Like social creativity, social innovation has multiple layers. It can entail reiterated creative interactions amongst individuals or collective networks possibly within complex multilevel social structures. It "transcends sectors, levels of analysis, and methods to discover the processes—the strategies, tactics, and theories of change—that produce lasting impact" (Phills, Deiglmeier, & Miller, 2008, p. 37). When a social innovation has durability and broad impact, it has aspects of *creative destruction*, which is economist Joseph Schumpeter's (1942) classic observation of how systems transform by persistently destroying old structures to create new ones. This means a social innovation can contain elements of *disruptive* and *catalytic innovation*, which are terms that refer to an innovative way of doing things that challenges the social structures we consider normal, and which may transform these structures or create new ones (Christensen, Baumann, Ruggles, & Sadtler, 2006). These new social structures may replicate previous successes; however, since they are scaled to match the current social need, they may generate financial, human or intellectual recourses that extend beyond the original system. As such, social innovations can "cross multiple social boundaries to reach more people and different people, more organizations and different organizations, organizations nested across scales (from local to regional to national to global) and linked in social networks" (Westley & Antadze, 2010, p. 4).

Social innovations emerge out of the webs of understanding that constitute our worldviews, and they play a key role in cultural evolution. Social belief systems and habitual thinking patterns and behaviour can undergo profound transformation at a local, regional or global level when the impact of social innovations are far-reaching (Westley & Antadze, 2010). This suggests that collective worldviews can 'scale up' or change synchronistically across social networks due to a catalytic cross-fertilization or contamination of cultural domains. This is an indication of the self-regenerating quality of a worldview, and thus the adaptability and dexterity of creativity.

Conclusion

Some say that having children makes us aware of being part of something infinitely larger than ourselves. Perhaps Mother Nature wired us up to feel this way because children are our lifeline into the future in terms of the propagation of our genes in biological evolution. When we're watching our child swim out to the island in the middle of the lake for the first time, nothing else in the world seems to matter or exist. But similarly, when we're in the throes of creative inspiration, it can feel like nothing else matters, like nothing else exists. Perhaps Mother Culture, the younger sister to Mother Nature but no less powerful, wired us up to feel this way because creative enterprises are our lifeline to into the future in terms of the propagation of our worldviews through a second evolutionary process: cultural evolution. Perhaps the time is ripe to heed the playful call of Mother Culture, to immerse ourselves in the thrill of creation and the satisfaction of innovation, as individuals and as groups, to reimagine and rebuild our relationship to this pale blue dot that we call home.

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35

Fun, Foibles and Frustrations

Monika Reuter

So … how does one study something that has no shape, no physical content, no clear definition, and that people usually describe in generalities such as, "outside the box", or "it's art"? Creativity does not exist in and of itself – unlike, for example, voting for a President. That is easily quantifiable. Asking a sample of respondents about their experiences in the past, or their attitudes towards political issues yields snapshots of what is going on at any one point in time in a society (i.e., cross-sectional data). But what if the subject is elusive and highly abstract and researchers want to know more, much more, and more deeply, than what a one-time response yields?

How do researchers decide what to study, and how to go about it? The first question is easy: we study what invokes in us a sense of curiosity and passion. The second question is much more difficult since the how is tied to time and money, familiarity with specific methodologies, a love or hate relationship with statistics or qualitative work. All methods have their pros and cons, so the ideal study seems to be a combination of several approaches (Babbie's triangulation, 2010). That is easier said than done. My triangulated research project evolved over time along a sequence of methodologies, not necessarily by plan but opportunity, and limited by time and money (see Fig. 35.1).

The present chapter tells the tale of practicing such triangulation from a sociological perspective, and the fun, foibles and frustrations I have been experiencing for the past eight years. Creativity is much easier to philosophize than to inquire about. By trying something that has, to my knowledge, not

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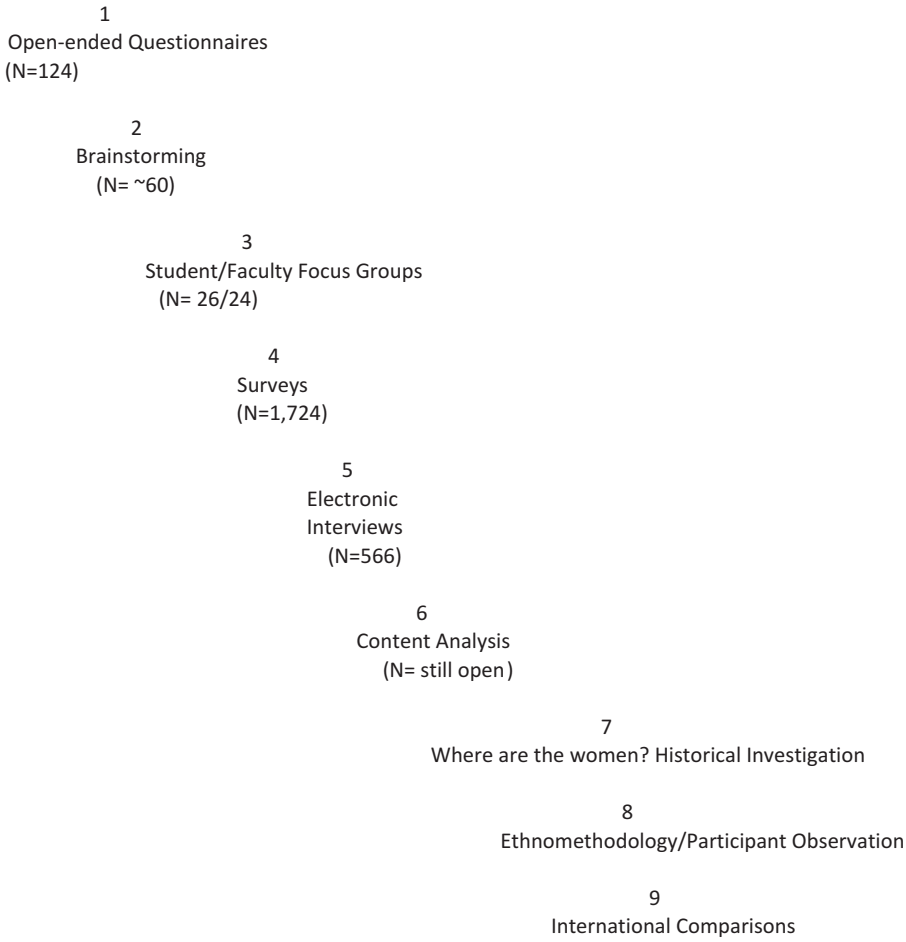

Fig. 35.1 The use of triangulation

been done – i.e., engaging a variety of research methodologies on the concept of creativity in sociology – I have done too little and too much, both at the same time, and I have arrived at conclusions about creativity which are unconventional (Reuter, 2015), and necessitate more research projects. The following figure represents the steps I have taken in the past 8 years to research the concept of creativity, and those that I am still planning:

While Babbie (2010) advocated the use of triangulation, he would probably be surprised about the various approaches described in Fig. 35.1 which resemble a bartender mixing up a martini. The way in which I am pursuing this project can, at best, be described as "nonchalant," i.e., dabbling a bit in quantitative data, throwing in a large dose of qualitative interviewing, sliding

in a dash of feminism, diving into historical records, observing as a participant, and dancing a bit along grounded theory by adding global interpretations of the concept – the cherry on the very top of the glass. It may not be the traditional pursuit of research, but it certainly has, so far, uncovered some insights.

The Beginning …

In August of 2009, while listening to the local National Public Radio station in Miami (wlrn.org) during my early morning commute, I heard a report about the Daily Creative Food Company restaurant in Miami. I had never thought of food being an outcome of daily creativity before. Since I work for a private art and design college that has the word "creativity" in its logo, I was curious what the concept meant to my students.

I started out by collecting 124 open-ended short questionnaires asking students in several Introductory classes how they defined the term. What I read were mostly "thinking outside the box" comments. Because it was conveniently held around the same time, I also conducted a focus group with faculty members during an all-school meeting. What I found was surprising: instead of the sophisticated, art-inspired, hoity-toity definitions I had expected, teachers resembled the students in commonplace platitudes, i.e., creativity remained a vague and abstract generality. I had my second encounter with the "thinking outside of the box" argument, an overused cliché that really has no meaning, merely a vague abstract that describes another vague abstract, resisting attempts at operationalization.

Instead of letting it go, I now wanted to know more deeply what students expected from creativity in their work and lives, whether they considered themselves gifted (some of the college's most dazzling and outrageous prima donnas certainly do), whether they thought they simply "had it" (sometimes bestowed by God) or whether they believed that it could be learned (Karwowski, 2014). This was the beginning of a love affair with creativity that has, far from fizzling out, become an obsession. As a good researcher, following good methodology procedures, I had to now design a good research project which would lead to good answers that could be used as the basis of good publications. Thus, I followed the traditional research model and constructed a survey as the next step with one of my Research Methods classes.

While starting the formal process of a research project, I read extensively. One thing I found out quickly is that creativity research is owned by the domain of psychology. Beginning with Guilford's 1950 call to conduct inquiries into creativity, psychology has produced a large body of work. Most

creativity research has been conducted in that field, occasionally with the assumption that creativity is innate, i.e., something a person is born with, or simply has (Rhodes, 1961) or, that madness is a side effect of genius – or vice versa (Eysenck, 1997; Keynes, 1995; Holm-Hadulla, Roussel, & Hofmann, 2010; Andreasen, 2014; Bett, 1952; Garber, 2002). Of course, this does not sit well with a sociologist who views the world through a very different lens!

For me, creativity is an outcome of environmental factors (see similar interpretations by Czikszentmihalyi, 1998; Glaveanu, 2014; Ekvall, 1996; Fayard & Weeks, 2011; Florida, 2002). Moreover, I see creativity as meaning different things to different audiences, fields and domains that need to agree on its value. Stein argued similarly by proposing that creativity consists of a combination of "the personality of the creative individual, his work, the process through which he achieves it, and some of the relationships between these and the culture in which they appear" (1953: 311). While he acknowledged the existing pool of knowledge which "exists in the field at the time" (1953: 311), he made too much of the "characteristics of the creative individual" (1953: 311). Creativity gets meaning depending on the society/culture/field which selects the ideas and products that are henceforth considered creative. It is socially constructed, and then taught in schools and colleges, through secondary socialization, training to fit roles and the adoption of skills. A generation of specialists and gatekeepers subsequently constructs new definitions through institutional framing, and the distribution of certificates and degrees. Thus, for example, it was very interesting to see a recent edition of Fast Company magazine (2016) which listed the "100 most creative people in Business." For me, it is not a question of who was voted to be in that illustrious circle, but who decided which people should be counted among the one hundred most creative, and the decidedly American interpretation of "creative people".

To bolster the sociological argument: a Chinese researcher does not agree with a German researcher on what is creative. Fashion designers have different criteria for creative products than do industrial designers and the ideas that make it through to the general public are the ones selected by gatekeepers of specific fields. Nothing is creative until people agree that it is. And that agreement is tied to culture and power.

Moreover, creativity is not an individual "thing" or talent – it is a result of group efforts. Some outstanding examples for this argument are presented by Sawyer (2007) who demonstrated our misconceptions about innovative geniuses who, in reality, were embedded within networks of support personnel; Martin (2011), who credits INTUIT social networks for ideas; Thompson (2002), who looked at corporate info-hoarding and found a growing number

or scientists working together in open-source biology on the internet to develop collective wisdom; as well as Vangkilde (2012) who investigated the groups that are responsible for the success of the fashion design firm HUGO BOSS. An example of the significance of groups in organizational environments is the success of IDEO, considered the best design firm in the world at the present time. Their ticket to success is not the creative idea about a product, but the way in which they "people" their design groups.

After conducting focus groups with faculty and students, putting a survey together became the ideal project for a Research Methods class in 2011. Widely disdained by students because of its dry, boring, no-fun-at-all content, constructing a survey seemed a welcome change – at least for me. The original 124 open-ended questionnaires and focus and brainstorming sessions served as the basis for building categories, and from there, the responses were operationalized into questions. At the end of the term, we had a one-page, 25-question survey based on a Likert-scale (see Reuter, 2015).

A foible popped up. The college I work for does not have an Internal Review Board. The Dean at that time assured me that all I needed was his permission to conduct the research. Instead of relying on his assurance, I put together a group of social science faculty and faculty from outside of the department, and invited their formal review of the project. Once I had their written approval, I proceeded.

Over the next year and a half, I handed out this survey to every class I taught, and asked other faculty members at the college to distribute it to their classes. The survey has also been the basis for teaching sampling in Research Methods classes. Because I was not able to obtain a list of the student population from which to select names randomly, all the class sections taught at the college (>500) were put into a fishbowl, and students selected a specific number of sections to visit and administer the survey in. This was the next foible, i.e., distributing surveys in this way did not yield a classic random sample. When finished with data collection, I had 1724 surveys, and the students' responses were at once surprising and not (Reuter, 2015).

… and the Next Beginning

After puzzling over student responses for a while, I wondered what employers would say about the significance of creativity. Most of the students from the applied art and design college will go on to work in so-called creative industries. Frustration occurred when I approached the Professional Advisory Committees (PAC) of the various majors in the school whose members come

from industry and are advising department directors on the latest developments in the field. I contacted 80 PAC members via e-mail and heard back from 3. This was not going to work. Another foible. I returned to the student career experts at the college who place students into internships and jobs, and asked for a list of employers to contact.

The first five face-to-face interviews with employers were conducted over lunch which I paid for. Then my husband showed me the math of interviewing: if I kept going this way, we would soon have to declare bankruptcy. I needed to find a different way of talking with employers. Frustration.

Students in a subsequent Research Methods class then helped to develop an electronic, open-ended interview (Reuter, 2015), and volunteered to send it to people they knew in a creative industry, or to past or present employers. This worked! I would subsequently offer extra credit (5 points on a 100-point scale) to students who collected e-interviews. The interviews kept coming, and I kept collecting because they kept coming. As a matter of fact, the interviews started to come in at such a rapid rate that I found myself with hundreds of responses, but no time to process them. And they kept coming. Frustration.

In any one of four calendar year terms, I teach between 5 to 8 classes. So now, after the issue of money, I hit the issue of time. A full-fledged research project simply cannot be accomplished expediently while teaching that much. That has been one of the most frustrating lessons I learned. I had known this before in theory, but now I was experiencing it in practice.

What I also learned eventually, after having collected 566 interviews, was that whether I reached 200 or 350 or 500 interviews, the basic themes remained the same. In addition, international responses seem to suggest that employer opinions concerning workplace creativity cross borders. Of course, this could only be verified if there were another wave of e-interviews geared towards international employers.

Some experts have likened qualitative research to colonization and imperialism (e.g., Smith, 2008; Vidich & Lyman, 2000), while Weber sees this type of research as “Verstehen” (Tucker, 1965) – an attempt at deep, rich understanding. I was concerned that mine was not really traditional quantitative and qualitative research. I have since found that some experts (Denzin & Lincoln, 2008) count analyses such as “frequency counts, tabulations, and low-level statistics among qualitative procedures” (2008: 14–15). Reporting numbers from the voluminous e-interviews is hence a legitimate way of comparing student and employer responses in data presentation (Reuter, 2015).

The Middle: Employing a New Method

If creativity is an important work-related talent in the future (MSNBC, 2018) and "the fundamental source of economic growth" (Florida, 2002: xxix), then college and university courses about creativity should be plentiful. Analysis of class materials, furthermore, should reveal whether the concept is taught consistently across schools. My assumption that all I would need to do was to google individual colleges and universities, and look for courses on creativity, was proven wrong. Frustration.

Currently, I am content analyzing creativity classes and have started with the twenty best business schools in the U.S. (MSNBC, 2017). Next will be the eight ivy league colleges and universities in the U.S. After that, I will look at the 50 best universities in the world (Center for World University Ranking, 2017). So far, cursory investigations of the business schools have revealed that courses on creativity are few and far between. Moreover, those courses are mainly geared at how to harness creativity to facilitate innovation for businesses, ergo profits.

Another source for creativity classes is MOOCs (massive open on-line classes), which offer free college courses to millions of people around the world, and which are hailed as the future of education. I have taken several MOOCs on creativity, but they have left me more frustrated than enlightened about the concept, and I am shocked at the lack of creativity courses offered to the global student community. In the Coursera.org environment, for example, there are less than ten – among the thousands of courses the company offers. In addition, creativity course is not necessarily creativity course: most courses are geared towards the business community (e.g., *Creativity, Innovation and Change* at The Pennsylvania State University) and or at teaching technical skills (e.g., *Excel/VBA for Creative Problem Solving,* Parts 1 and 2 at the University of Colorado, Boulder). Classes and certifications offered by such distinguished sources as IDEO (2018), are expensive and taught by practitioners, not academics.

The Last Beginning

So … what do I hope to achieve when all of these phases are complete? When I put it all together, like a bricolage, I will be able to present deeper insights than individual parts could yield. I should add that both reliability and validity, the darling pets of social researchers competing with "real" scientists

concerning the credibility of their data, are no longer my concern. After having done both quantitative and qualitative analyses, it is no question that qualitative research is much more fun and delivers deeper understanding. In addition, I agree with Denzin & Lincoln that "qualitative researchers stress the socially constructed nature of reality …" (2008: 14). As my model (Reuter, 2015) suggests, the concept of creativity is, from a sociological perspective, exactly that: socially constructed.

After the content analysis, I will move on to three more approaches: (1) a critical historical analysis of the role of women in creativity, (2) participant observation in a creative company (ethnomethodology), and (3) collaborative international research. The cross-cultural investigation promises to be especially fruitful to arrive at a determination of how important creativity is in different societies. The fact that people in other cultures see creativity differently has been shown, for example, by Glaveanu's (2011) research on Romanian practices of egg decoration. It elicits uncomprehending frowns among my students in the United States. Why would anybody be interested in painting, or painted, eggs?

Another dimension to an international comparative inquiry would be asking whether a globalizing American cultural idea system gives creativity a definition that may be very different from traditional understandings in other cultures. Are we possibly losing meanings of creativity, and their products, in cultures around the world because of Americanization?

Conclusion

On April 6, 2018, MSNBC broadcast an interview with APPLE's chief executive officer Tim Cook as part of its *Revolution* series (MSNBC, 2018). Among the topics discussed in this interview, Cook described a new educational initiative with Northwestern University entitled "Everyone Can Create" which aims at enhancing learning and creativity in the classroom. While describing this initiative, Cook stated that if people are not creative, they are going to be obsolete in the future because parts of everybody's work will be automated, and there will come a time when all jobs are software based. The answer? Everybody needs to learn how to code! So … creativity is coding and coding is creative?

Goodness, this project has been fun! There will be many more foibles in the future as this research continues. Someone please grant me the patience needed to deal with the frustrations that are sure to come. So … let's get started on the next eight years.

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36

Extraordinary: Reflections on Sample Representativeness

Viktor Dörfler and Marc Stierand

Introduction

In this chapter we offer a reflection on the notion of sample representativeness from an interpretivist-qualitative perspective. Specifically we are looking into the idea of learning about a phenomenon through examining extraordinary individuals characterized by that phenomenon; to describe them we use the term *'extraordinary'* as a noun, thereby building on Howard Gardner's notion of 'extraordinary minds' (Gardner, 1997). We are looking at the 'extraordinary' in their professional socio-historical contexts, as the phenomena we are interested in cannot be divorced from the contexts in which they are embedded. In this particular book chapter we are interested in the phenomenon of creativity, and the two research projects on which we base our argument are also concerned with creativity. However, we do not see any reason why similar considerations could not be made in other areas – but we do not suggest that a simple generalizability is possible.

The basis of our reflection are two research projects we have done in the past: In the first one, we conducted 'insider interviews' (the second-named

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author used to be a chef in Michelin-starred restaurants) with 18 extraordinary chefs in order to gain a better understanding of how creativity manifests itself socio-culturally in the culinary domain (Cousins, O'Gorman, & Stierand, 2010; Stierand, 2015; Stierand & Dörfler, 2012b, 2016; Stierand, Dörfler, & MacBryde, 2014; Stierand & Lynch, 2008). In the second one, we interviewed 20 extraordinary scientists, including 17 Nobel Laureates in order to gain a better understanding of cognitive complexity and how cognitive complexity is manifested in the socio-cultural acceptance of creative outcomes in the scientific world (Dörfler & Eden, 2014a, 2014b, 2017).

We have presented our research at various conferences, and, perhaps as we were so passionate about it, we have received a great deal of interest from others, mainly PhD students and early career researchers, who were keen to undertake similar research projects. But, although we believe that the methodological journey we have taken can be an excellent path to very interesting and meaningful research, we cannot wholeheartedly recommend it to junior colleagues, knowing the difficulties they will face when trying to justify their findings and methodological choices and the uncertain profits in the form of publication of the results (see an excellent overview of the difficulties and profits in Lebuda, 2014). We made our initial methodological choices, i.e. interviewing extraordinary chefs and scientists, purely intuitively that is, we just knew that the insights we could gain from these people would potentially lead to excellent findings. However, this is not an acceptable justification in the academic world. Therefore, we started to develop a framework for conducting this type of research, but we are not quite there yet. This reflection chapter is a midway point for taking stock of the convincing arguments we have developed over time and of the problems we still need to solve.[1]

The Purpose of Sample Representativeness: The Principle of Generalizability

The reason for aiming to work with a *representative sample* is to achieve generalizability of the research findings from the sample to the whole population of instances about which we inquire. After all, generalizability is considered by

[1] ACKNOWLEDGEMENT: We have presented various aspects of our thinking about this topic as a series of developmental papers (Dörfler & Stierand, 2009; Stierand & Dörfler, 2011, 2012a, 2013) in the Research Methodology Special Interest Group (RM SIG) of the British Academy of Management (BAM) conference. We would like to thank members of the RM SIG as over the years they helped us clarify our thinking with their constructive criticism, comments and most of all questions for which we did not have satisfactory answers.

many as the 'Holy Grail' of research, because it is considered to be a precondition for theory building (Wacker, 1998; Weick, 1989, 1995), referring "to the extent to which research findings apply to contexts other than the one researched" (Gibbert, 2006: 126). It is important to note that this description of generalizability goes beyond applying the findings from the sample to the population; it also includes applying those findings in different populations. However, for now we are only concerned with generalizing from the sample to the population. Also, it is essential keeping in mind that it is not the property of the *theory* but of the *research findings* that makes it possible to support or falsify a theory (cf Gibbert, op cit).

In order to achieve findings that can be generalized from the sample to the population, researchers usually try to employ a sample that is representative. Representative means that the sample should replicate all the salient features, and their statistical frequency, of the population from which it has been drawn. As the phenomenon under scrutiny is also one of the salient features, this means that if we do have a representative sample, our research findings should be generalizable by definition. But, how can we achieve a representative sample?

Before answering this question, we need to unpack one further assumption about generalizability. Generalizability is usually identified with external validity, because it is concerned with 'the intuitive truthfulness of the theory' (cf Gibbert, Ruigrok, & Wicki, 2008) about a phenomenon beyond the setting in which the phenomenon has been studied (e.g. Calder, Phillips, & Tybout, 1982; Eisenhardt, 1989; Gibbert, 2006; McGrath & Brinberg, 1983; Scandura & Williams, 2000). If, for instance, we are interested in how scientists create their models, we should find a setting in which we conduct the empirical study, but we would want to come up with something that applies to all scientists. Intuitively there is something very wrong with this expectation: scientists may have a variety of ways of creating their models, and even the same scientists may do this differently in different professional sociohistorical contexts. Furthermore, we tend to forget that external validity, as the third level of validity, assumes that the previous two levels, namely the internal consistency and the construct validity, are satisfied as well. Internal consistency simply stands for a model with no contradictions, and we are ready to accept this to be satisfied since someone of the research community, for instance reviewers, should notice any contradiction sooner rather than later. Construct validity refers to the extent to which an inquiry is able to portray a truthful picture of reality and actually studies what it claims to be studying (Denzin & Lincoln, 2000; Gibbert et al., 2008). Construct validity is thus typically associated with the data collection phase (Gibbert et al., 2008:

1467) – however, we are still at the point of choosing our sample, and therefore we should assume that generalizability also needs to cover construct validity. We will get back to this point later, when we offer an alternative view of what makes a representative sample.

Hence, if the representative sample should replicate all the salient features of the population together with their statistical frequencies, we need to control for all possible salient features. Even if we did, we cannot be sure that the phenomenon that we study would also be replicated, as we cannot control for that at the time when we are investigating it, and we have to admit that for any human and social phenomena this would be simply impossible: For human phenomena, this would mean having a control for every single human characteristic, and for social phenomena, in addition to these, we would also need to cover all relationships, interactions and influences between humans. According to this logic, if we want, for instance, to study the phenomenon of creativity in the culinary domain, we would then typically try to examine a representative sample of chefs in order to achieve general statements from our findings that apply to the whole population of chefs. Therefore, for the sampling process we would need to account not only for the culinary skillset of each chef, but also for their personality, people they work with, the intellectual tradition of the domain (for which we would need to consider the previous generation, and the one preceding it, and so forth, all the way back to the creation of the domain), all the interactions, and even for the mood of the particular chefs at the time of the investigation. Moreover, even if we would be able to do this somehow, we would need to do it for the whole population first, as otherwise we cannot make sure that the sample was representative!

Furthermore, assuming for a moment the impossible of having fulfilled all the above conditions for achieving a representative sample of chefs, we may still ask: What could we learn from our research? Probably quite a few things about the *population of chefs* but perhaps very little about the *phenomenon of creativity*, because the sample is representative of the population of chefs but not of the phenomenon of creativity! We understand that this argument is harsh, and we admit that we are exaggerating a little bit – but only a little bit, to emphasize the underlying uncertainty. Intuitively, however, it makes sense that if we are establishing a sample that is representative of the population, it will reflect the population, but there is nothing to suggest that the phenomenon of creativity has any level of uniformity over the representative sample or over the population chefs. The argument is perhaps more obvious in case of exceptional creativity but by implication this can be extended to creativity more generally – there are no chefs with 'average creativity', some are more creative, some less.

Problems with Sample Representativeness: The Principle of Mediocrity

As aforementioned, if a sample is representative of a population, it will replicate its features and thus also the research findings. Consequently, what does it then mean that we could learn quite a bit about the population of chefs? To put it bluntly: learning about the population of chefs means that we could learn things about the average chef (thereby substituting the 'average creativity' of the chefs with the 'creativity of the average chefs') while knowing that this chef is not real and does not exist. Naturally, we would also learn how much members of the sample can deviate from this average, but what could we learn about creativity in the culinary domain? Maybe something along the lines that the average chef produces 17.34 creative dishes each year. Whereby being creative could mean many different things, from replacing thyme for rosemary to inventing hot ice-cream. How can we be satisfied with such findings? If a shoe factory averaged out our feet sizes and produced only shoes at size 8.76 (UK measure), would we be happy wearing these shoes? Are we academics really so much more willing to compromise than the shoemakers? It seems that we not only believe that a representative sample can be achieved, but also that the average of this sample is representative of its population!

Still, even if we are willing to compromise, we need to go back to the question of how to achieve a representative sample. Conventional wisdom suggests that if a sample is sufficiently large it should be representative. This is intuitively obvious: if the whole population is the sample, it will certainly be representative and the fewer are missing from the whole population, the smaller the sampling error. In real life, though, we often need, for reasons of practicality, a much smaller sample to be representative. And here is a clever trick: we use a random sample and assume that it is representative. The basis of this assumption is that the laws of chance self-correct the outliers present in any population. However, we firmly believe that this is a false heuristics based on the assumption that the laws of chance are fair and reinstate equilibrium every time there is a deviation from the equilibrium, meaning in the context of samples, reinstating the average. This is what Kahneman and Tversky label the 'belief in the law of small numbers', and it seems to lack any basis (Kahneman & Tversky, 1972; Tversky & Kahneman, 1971). Furthermore, we face three further problems with this approach: (1) the population uniformity, (2) the technical feasibility of randomizing, and (3) the reference point of population and phenomenon.

Population uniformity alias the black swan problem. When John Stuart Mill (1861) developed his inductive method in order to operationalize Sir Francis Bacon's (1620) principle of 'true induction', he actually declared that the nature is uniform. Not too many noticed this then, and not many are aware of this now. However, this is what really led to the black swan problem, which did not only destroy induction but deduction as well: How many swans we need to see in order to know that all swans are white? The only correct answer is: *all of them*. Thus, in induction we would need to examine all instances of a population and in deduction we would need to verify our hypothesis against all instances of a population to make any rigorous claims. But, why can we not substitute a random sample for the whole population? On the one hand, as we said previously, because the laws of chance may not be fair. On the other hand, as the population is *very far* from uniform. This is emphasised by March, Sproull, and Tamuz (1991) example of rare high-impact events in organizations, Taleb's (2008) delineation of 'Extremistan' and 'Mediocristan', and Gladwell's (2008) notion of outliers. A simple example: let us assume that a research agency would use a random sample of 100 people to survey what people in the US spend their money on. Income will be one of the variables to be considered and, of course, is a volatile variable, particularly if someone like Bill Gates or Larry Page would make it into the sample. Thus, the problem of the outliers is not that they deviate from the average, but that they can deviate so much, that it affects the average itself.

Technical feasibility of randomizing. If after all this, we would accept all the shortcomings and actually attempt to get a random sample, we are stuck once again. How would we attempt this? 'Generating' something at random is not as easy as it seems. Even generating random numbers for a spreadsheet table is difficult; we can only generate random numbers according to a particular distribution function. But, how could we randomize chefs or scientists? First, collecting all the names in the population would be a tedious task. Then, we need to somehow randomly choose from the list, and this would always lead back to the 'not-entirely-random' generated numbers. Therefore, the usual approach is not to pay attention to anything and simply trusting in the fairness of the chance. However, often even unenticingly the sample gets biased. For instance, in the Nobel Laureates project (there was no random sample there), the person transcribing the interviews concluded that the Nobel Laureates seem to be 'lovely people'. Actually, there is a built-in bias in the system: those who agreed for an interview must have been 'nice people', otherwise they would probably not have agreed to participate in the interview. Hence, simply conducting the interviews created a bias.

Reference point of population and phenomenon. We noted earlier that the notion of generalizability comprises, apart from external validity, also the construct validity. Thus, we have to ask: Can a random sample of chefs generate findings about the phenomenon of creativity in the culinary domain? Or, can a random sample of scientists lead to findings that tell us about cognitive complexity? The answer is actually not a strict 'no' – it would be more correct to say 'probably no', but even if the findings would tell us something about these phenomena, we will not know about it. The reason for this is that our awareness would be so occupied with the *proximal*, with the samples of the chefs or scientists in front of our eyes, that we would not be able to focus anymore on the *distal*, on the phenomena that they represent and that we are interested in (Dörfler & Ackermann, 2012; Polányi, 1962a: 55–65). Of course, "we are aware of that from which we are attending to another thing, in the appearance of that thing" (Polányi, 1966: 11). However, it would lead us nowhere if we dissected Rachmaninoff's fingers, comparing them to the average piano players' fingers; we would know nothing about the essence of romantic classical music. Instead, we have to get intuitively into Rachmaninoff's mind, wander down to his fingers and feel ourselves what it means to represent romantic classical music. In a sense, we have to forget about Rachmaninoff as a composer and start picturing through him the essence of romantic classical music. This is what we mean by attending from the proximal (i.e. the sample of composers, chefs or scientists) to the distal (i.e. the phenomenon of romantic classical music, creativity or cognitive complexity). And, in order to make this intuitive journey, we need to travel through the 'extraordinary', because they have developed into the embodiment of the phenomena they represent.

Revising the Notion of Sample Representativeness: The Principle of Extraordinary

The methodological approach that we have used in our chefs and top scientists studies is grounded in the seminal works of Csíkszentmihályi (1997) and Gardner (1993). Csíkszentmihályi conducted a series of interviews with 91 exceptionally creative individuals and Gardner processed the complete lives of seven extraordinary creative individuals of the modern era. If we examine these works more closely, we will find that they yielded incredible insights, resulting in new conceptual models of formidable explanatory power that are

frequently used as frameworks or starting points by creativity researchers. They also served as basis for further significant results of these authors.

By focusing on 'the extraordinary', Csíkszentmihályi did not only arrive at the systemic view of creativity, immensely popular in the social psychology research on creativity today, but was also able to theorize the initial version of the 'flow' concept (Csíkszentmihályi, 2002). In turn, Gardner, who regularly uses Csíkszentmihályi's systemic view of creativity, realised that Gandhi was somehow different from the other six examined extraordinary individuals, and from this basis arrived at a powerful account of the essence of leadership – examining this time the lives of several extraordinary leaders (Gardner, 1995). Furthermore, on the basis of these two works Gardner gained insights into the making of extraordinariness (Gardner, 1997). With hindsight, we can also see that Maslow (1968, 1970) examined the extraordinary (i.e. extraordinary individuals as well as extraordinary experiences of otherwise ordinary people) and thereby uncovered the experience of self-actualisation (a comprehensive discussion of using extraordinary as "significant samples" can be found in Simonton, 1999).

Based on these studies, 'the extraordinary' can be described as an autotelic individual who is able to destroy or fundamentally alter existing structures within a domain, shut down existing domains or create entirely new domains. Therefore, we argue, that by studying the extraordinary we can gain a better understanding of domains, neighboring domains as well as of complex phenomena within these domains. Hence, we argue that extraordinary individuals are more representative of their domain than the 'normal' population in that domain, and also more representative of some of the exceptionally complex phenomena in that domain, such as creativity. As Simonton (2014: 11) says, such significant sample "contains exemplary cases of the phenomenon".

With this argument, we do not intend to downplay the significance of more mundane forms of creativity and we are certainly not suggesting that creativity is the sole domain of those who achieved extraordinary results. Furthermore, we also acknowledge the problem of identifying the extraordinary; this works well in some domains, where there is a formalized and generally accepted structure of gatekeepers, such as the Michelin guide in haute cuisine and the Nobel Prize committee in science. This does not mean that in other areas, such as in retail for example, there are no extraordinary creators, only that we would have hard time to justify their extraordinariness. However, such justification is primarily important from an academic perspective, that is, for doing research. Those who are in a particular field of retail will probably know who the extraordinary are in their respective domains.

We suggest that a physics Nobel Laureate is likely to be closer to the essence of being a physicist than 100 of the 'average physicists', and closer to the phenomenon of creativity in the domain of physics. Similarly, a Michelin-starred chef is likely to be closer to the essence of being a chef than a sizeable random sample of average chefs and closer to the essence of creativity in the culinary domain. (Assuming that there is an essence of creativity, which may also depend on the socio-historical context.) We were very careful in our formulation here, and we used 'likely' to tune down what we say. There is a tiny little chance that a Nobel Laureate or a Michelin-starred chef is not extraordinary. Still, we chose to work with this substitution, as this is as close as one can get to justifying that someone is extraordinary. There are certainly others, perhaps many, who do not have a Michelin star or Nobel Prize, who are also extraordinary, but those who won the highest accolades of their respective domains, should fall in this category.

Having conceptualized this argument for studying the extraordinary, we have realized that we are replicating a two millennia old story: we seem to be talking about the Platonic ideas. The Michelin-starred chef and the Nobel-Prize-winning physicist are closer to the idea of 'chef' and 'physicist' as well as to the idea of 'creativity'. We have also found evidence that creativity transcends the domains, as not only the Nobel Laureates of the different sciences were giving similar accounts of what they do, and how they feel about their domains, but also the chefs provided accounts of creativity that show an almost scary similarity to those of the scientists. However, as noted before, we have to be mindful of the socio-historical context – if there is a domain-transcending aspect of creativity, it does not neglect the importance of the situational aspects, interactions, etc. We are simply exploring one side of the coin, but we do not suggest that the other side does not exist.

Studying the extraordinary chefs and scientists, we would say that these people are really in love with what they do, they are hooked, perhaps even obsessed with creating and with understanding the world of their respective domains a bit better. Hence, we claim that the extraordinary is not representative of the population, but, in fact, representative of the domain and of the phenomenon. How can this be explained? Polányi's (1962a) conceptualization of personal knowledge can help us understand why this works.

Polányi suggests that the personal knowledge overcomes the objective-subjective dichotomy by focusing the interest on the phenomenon itself. This is captured in the notion of 'indwelling' (1962a, b). The knower who is in love with the domain and with the object of knowing feels unimportant from the perspective of the knowing process – in a sense, they almost disappear, their

indwelling becomes so deep. A similar idea is outlined by Maslow (1966: 53) as the 'Taoist conception of science' by saying:

> … one must be able to respect what one is examining or learning about. One must be able to let it be itself, to defer to it, even to approve of its being itself, and to feel reward and even joy in watching it be itself, i.e., unfolding its own inner nature, undisturbed and unchanged by the nature of the observer, unintruded upon.

This means that extraordinary individuals think that their domains and the problem they are engaging in is far more important than they are themselves, and this love and respect gives them the strength to get so incredibly exposed that in this openness they somehow fuse with their domain and with what they study. We could call this 'complete indwelling'. This observation also explains why highly knowledgeable people in all domains seem to have their primary loyalty to their domain, and only secondarily to the organization for which they work. For our chefs and scientists it is fundamentally important that the culinary domain or physics advances, that if their organization does not make it possible for them to work on this advancement, they will leave, because they feel that this is in the best interest for their domain. Don't mistake this for humbleness! Far from that. If these people would be humble, they would think that someone else will progress their domain; that someone else will figure out what needs to be done. But, no, they feel and know that it is their duty and purpose, because they are the most capable!

We need to note, that our interest in these two studies was not to understand what the great chefs and scientists are like, we were interested in what creativity in the culinary domain and cognitive complexity of scientists is like at the highest level of expertise. Hence, we did two things: first we identified the extraordinary as representative of the particular phenomena we were interested in, and then we substituted Michelin stars and Nobel Prizes for the notion of the extraordinary. We believe that this worked out quite well.

> If we want to know how fast a human being can run, then it is no use to average out the speed of a 'good sample' of the population; it is far better to collect Olympic gold medal winners and see how well they can do. (Maslow, 1971: 7)

We have received a question at this point, actually many times, about whether we would discourage people who are not extraordinary. Of course not, for two reasons. Not only those should run, who win the Olympic gold

medal. And, it is good to play football (soccer) even if someone cannot play like Pelé (https://en.wikipedia.org/wiki/Pelé) and will never be able to become Pelé. And this is fine. However, we personally believe that people should only play professionally, if they *want to* become the next Pelé. Even a second-league player should watch Pelé's game. Those who are not interested in how Pelé plays they should only play for recreation. Linking this with the above argument on more mundane creativity, we are sure there are many Pelés out there to be discovered but as long as they have not proved themselves in a world championship, we don't know who they are, we may only suspect that some of the talents we follow over time could become the next Pelé (see Stierand, 2015).

Commentary

In the course of publishing our findings based on extraordinary chefs and scientists, we have been repeatedly asked to do a comparison to 'not-so-extraordinary' members of the same populations. Although we do see value in a comparative study, we rejected to do this in the particular papers we were publishing so far and in this final part of our chapter, we want to provide reasons as to why we rejected this line of research. The way we present our reasons is meaningful, but speaks to intuitive rather than analytical comprehension; we are yet to find formulations that could pass the criteria of academic journals.

First, studying the extraordinary is incredibly exciting in its own right. We have to emphasise that we do not assume that only those chefs in the Michelin Guide can be extraordinary or that all extraordinary scientists won the Nobel Prize. All we assume is that those who have been awarded these highest accolades are at the top of their domain, but we are ready to admit that many others may also be there. As researchers we could simply 'feel' how we are developing, growing, being embedded in this process. For instance, in one of the papers about the Nobel Laureates research, the topic was how they see excellent research. While there would be merits in comparing how extraordinary and non-extraordinary characterise excellent research, we found it more interesting how those extraordinary researchers see it, who regularly conduct excellent research. The comparison can only come later, and it could be useful, for example, for the 'not-so-excellent' to become better.

Second, it is unclear what the reference point of the comparison should be. What should be juxtaposed to the Michelin-starred chef? The celebrity TV chef, a professional chef in a restaurant chain, a fast-food food cook or a

hobby cook? Similarly, with whom should we compare a physics Nobel Laureate? With someone nominated, who did not get it?[2] What if the nominee gets it next time? Or with a physicist who only publishes in B-journals? Or with a secondary-school physics teacher? And even if we decided on the counter-example, how would we start such an interview? We would not expect much success from an interview starting: 'I would like to talk to you about your mediocre research to contrast it with those who are really good.' Of course, it would be sensible to compare the top tier with the penultimate one. However, for this we would first need to have people classified into different tiers, and in most disciplines we do not have such classifications. We do in chess, which is why much of the research into the levels of expertise was conducted with chess players. We believe that investigating the extraordinary can also be helpful in developing these levels.

However, the third point is the most difficult one. The biggest problem is that the mediocre and the extraordinary are not in the same discipline, regardless if the name is the same. As Ferran Adrià, one of the extraordinary chefs we interviewed, said:

> [C]omparing the cooking here with home-cooking is like comparing a Formula 1 car with an old Daimler with which you cruise and enjoy the scenery… The two have absolutely nothing to do with each other… It is absolutely not like home-cooking and it is not familiar cooking! (Ferran Adrià quoted in Stierand et al., 2014: 23)

Another compelling example we have found in a book by the Hungarian writer Péter Eszterházy about football/soccer (Eszterházy, 2006). He played semi-professionally in a minor league; his younger brother was a major league professional and regularly in the national selection. Eszterházy played with his brother after a very long time and he felt like when as a child he got lost at the railway station and ended up standing surrounded by moving trains (ibid: 15). He also mentions an occasion when he had the privilege of playing with Hidegkuti, "the third genius of the Golden Team [or Magical Magyars] besides Puskás and Bozsik" (ibid: 16, our translation), who was over sixty at the time. These two experiences led him to a deep insight about the nature of extraordinary:

[2] An additional difficulty here is that the Nobel Prize nominations are confidential for 50 years following the nominations. Furthermore, we can see that both in the case of Michelin stars as well as in the case of the Nobel Prize, the award will usually have significant delay compared to achieving the extraordinary level, so it could be expected that often there would be no recognisable difference between the comparison groups.

> We [i.e. minor league players] think that we are like the great ones, like the major league, only worse. That if we were a little faster, a little more muscular, we would also be… But we know the spirit of the game as well as they do. Not at all. They play a different game 'up there'. (ibid: 15)

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Why Researches of Professional and Eminent Creators' Self Beliefs Need Social Context

Izabela Lebuda and Mihaly Csikszentmihalyi

Creative Self-Concepts from a Social Perspective

Creative self-concepts are a set of beliefs about the meaning of the creative process, and one's own role in it. They play an agentic role in engagement with and continuity in creative activities (Karwowski, Lebuda, & Beghetto, in press). High self-confidence in one's own creativity, and a high level of creative identity (treating creativity as an important part of self-concept) are crucial to move from creative potential to creative achievements (Dollinger, Dollinger, & Centeno, 2005; Helson, 1967; Helson & Pals, 2000; Szen-Ziemiańska, Lebuda, & Karwowski, 2017), and is a central attribute of successful creators (e.g. Albert & Runco, 1986; Barron, 1983; Barron & Harrington, 1981; Dowd & Pinheiro, 2013; Feist, 2014; Lebuda & Csikszentmihalyi, 2017; MacKinnon, 1978, 1983).

The topic of self-concepts is becoming more and more popular among creativity scholars (Karwowski & Kaufman, 2017; Karwowski, Lebuda, & Beghetto, in press). Although creative self-beliefs were initially thought to be individual characteristics, like personality (Karwowski & Lebuda, 2016, 2017), now they are thought to be more malleable and to depend on the

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social context. That the self is relational is of course not a new concept (Vygotsky, 1980), nor is the idea that people have as many selves as they have interactions with others (James, 1890). The psychology of creativity recognizes that the creative self is firmly embedded in social relations, and shaped by the internalized perspectives of others (Glăveanu, 2017). It was proved, in the case of mini- and little-c creativity (Kaufman & Beghetto, 2009), that self-concepts are influenced by family (e.g. Karwowski & Barbot, 2016), teachers (Beghetto, 2006; Karwowski, Gralewski, & Szumski, 2015; Wigfield et al., 1997), and friends (Karwowski, 2016). The social context also plays a significant role in shaping the beliefs of professional and eminent creators, including impacts on the creators' identity, such that creators' role is co-constructed through a negotiation between personal experience and social, cultural definitions and expectations (Glăveanu & Tanggaard, 2014; Lebuda & Csikszentmihalyi, 2017). What is more, the way creative people define their role as creator is not only shaped by social interaction, but also by how they fulfil their other life obligations – for example, being a partner (Lebuda & Csikszentmihalyi, 2018).

Development of the creative self of professional and eminent creator is a social process (Lebuda & Csikszentmihalyi, 2017; Taylor & Littleton, 2012) and, in our opinion, in order to understand what defines a creative self for such people – what roles it plays and how it is developed – we need to go beyond individualistic characteristic and resources, and look at the whole creative system: the person's interactions with a filed, a domain and a broader culture (Csikszentmihalyi, 1996).

Socialization to the Domain as Part of a Creator Self-Defining Process

Before someone becomes a professional creator, one has to learn the traditions of a particular domain, has to be socialized, become immersed into previous works, and understand the rules of a chosen area of activity (Csikszentmihalyi, 1996). Being socialized to the domain involves not only learning how to perform a given craft, acquire the knowledge and techniques of work, but also understand what the meaning of creativity in the activity involves, and what are the creator's obligations to the domain (Csikszentmihalyi, 1996; Lebuda & Csikszentmihalyi, 2017), and often to the broader society (Csikszentmihalyi, Condren, & Lebuda, 2016; Lebuda, 2016). Some of the domain rules are not passed on by explicit lectures or training, but more as

tacit knowledge; for example, by vicarious experience (Bandura, 1986) – observing how it is perceived, and evaluating the work and behavior of representatives of the domains.

Identity as a creator grows during socialisation to exact chosen domain and sub-discipline (Baer & Kaufman, 2005), and creators perceive themselves more like a musician or even representative of particular movement, a part of group when people share not only a career path, but also a hierarchy of values, style of life, and an understanding of their responsibility to their role and its obligations (see Haslam, Adarves-Yorno, Postmes, & Jans, 2013; Lebuda, 2016). The process of socialization to a particular sub-discipline also requires the development of metacognitions (Kaufman & Beghetto, 2013), by which the creator gains the knowledge on how to use resources in the relevant domains, as well as when and how to present his or her own abilities.

Gaining knowledge about own abilities, role obligations, and rules in the domains are crucial, especially in the early stages of creators' career. Valuable sources of the information during this period include more experienced members of the field, especially authorities: models, mentors (Getzels & Csikszentmihalyi, 1976). Later in life, more and more essential is feedback from peers, the colleagues from reference group (Wallace & Gruber, 1989; Mockros & Csikszentmihalyi, 1999) and in later adulthood important source of information valuable for self of creator are successors, mainly students (Lebuda & Csikszentmihalyi, 2017).

During socialization, the creators' self is shaped not only by interactions with others, but also by growing in a particular place, time, and culture (Stein, 1953), or historical context (Lebuda, 2016). These will influence how the role of creator is perceived, and what obligations are connected with this kind of career.

Social Validation as a Part of Creators' Self-Confirmation Process

To be a professional creator, it is important not only going through the process of socialization, but also to accept the judgment of work, and to be accepted by others as (Csikszentmihalyi, 1996). We can't imagine a creator without an audience (see Glăveanu, 2013). For professional and eminent creators an important part is played by the field – the people who judge the products, play roles as gatekeepers, and decide whether it is worth or not to present the product to the audience, or to pass it to the domain (Csikszentmihalyi, 1996).

Novel products are judged with consideration of the cultural context, of previous works in the domain, of traditions, and trends (Csikszentmihalyi, 1996; Sternberg & Lubart, 1996). The process of judgment is socially immersed. It is often based on how important or how valuable the given product is for society at the current time and place (Stein, 1953) and who is the author and what is his/her image (Kasof, 1995; Lebuda & Karwowski, 2013). So, among other traits, the communication skills of creators, the persuasion abilities of a creator or his/her representatives, play an important role in the judgment process (Simonton, 1995). The opinion about products sends crucial information about rules in the domains, shape the meta-cognition skills of potential creators (Kaufman & Beghetto, 2013). The judgment of creative products' links with the perception on how creativity in the chosen domain is recognized in turn impacts the self-concept of a creator. When people who work in more than one domain, it is usually recognition by one field that pressed the creator to devote more effort to one area – to the domain where their work gained more recognition. (Szen-Ziemiańska, Lebuda, & Karwowski, 2017).

Especially at the beginning of a professional career, being noticed by the field serves as a crystallizing experience (Walters & Gardner, 1986), and strengthens the identity of the creator as representative of the chosen domain. Attention, appreciation, tokens of respect – even if they are not the main motive to create – help to confirm the professional's identity (Lebuda & Csikszentmihalyi, 2017).

Avoiding the "Fundamental Attribution Error" in Research of the Creators' Self

When creative products are prized or rejected by the representatives of a field, this shapes the current state of the domain, communicates what are the trends in the domain (Sternberg & Lubart, 1996), and thus shape the future of the domain, and the conditions that might socialise the next cohorts of creators. When creators engage in self-evaluation – define themselves, judge their own abilities, the value of their own works, when they decide how and when to present their product to an audience and to the field – they take into consideration information from the culture, the symbolic world of the domain, and the future perception of themselves and of their work by others. In summary, the self of professional and eminent creators is deeply immersed in the social context. It is shaped during social interaction with others; it is a result of real

or imagined feedback from the field; from criteria of judgments that depend on a particular time, place and history.

Taking into consideration all these interactions which shape the creators' self, we believe that planning the research of this and related topics should go beyond the personal creator's resources; not overemphasize internal disposition over external causes, and being careful about avoiding the "fundamental attribution error" (Ross, 1977). The need of socializing the line of research is currently one of the more often postulated changes of research in this area (see also Glăveanu, 2017; Karwowski & Beghetto, 2017; Karwowski, Lebuda, Beghetto, in press). We hope that the above reflections provide arguments that in research of professional and eminent creators we should not separate the self from society, domain, and field (Montuori & Purser, 1996).

In our opinion, to fully understand how the self of professional and eminent creators is developing, we need to look for research methods that allow us to see an interaction between the person, field, and domain. We do not want to recommend any particular paradigm, or method of research, but underline that we need more transdisciplinary and dynamic measure of the creator's self, some method which will allow us to see the role of significant others (like for example Life Positioning Analysis – Martin, 2013, 2016); check the dynamics of change in self-concept during different circumstances, using some micro-longitudinal and dynamic measures (like the Experience Sampling Method – Larson & Csikszentmihalyi, 1983, or process-immersive qualitative studies – Glăveanu, 2015), and try to measure the impact of past and anticipated future experiences (see Karwowski & Beghetto, 2017), trying to understand the domain-general and domain-specific expertise relevant to creators' self with the social, cultural and historical context (using for example psychobiography or case studies – Csikszentmihalyi, 1996; Gardner, 1993; Gruber, & Wallace, 1999).

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